Information Materials

WOBET-HYDRET

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1.0 - Description of the company

WOBET-HYDRET is a company with Polish capital and above 30-year experience offering terminations in the construction industry.

The business progress, was directed in 1998, by getting the first technical approvals, issued by the Institute of the Environmental Protection. They concerned drainless containers and septic settling tanks . Soon the series of biological sewage treatment plants was drafted, based on the technology of the sinkable trickling filter which already in the year of 2001 also got the technical approval. For the entire period of cooperation with the Institute of the environmental protection, in total 30 technical approvals have been gained. It enabled the offer of wide range of products as well as ensuring the compliance with applicable regulations .

For the technological development of the company, a technical development of the factory which included investments in construction of the new factory floors and the purchase of a few technological lines for the production, also accompanied on different technologies. We gathered over forty awards in our current achievements and distinctions. At present as well as for years of activity,

POLISH TECHNICAL THOUGHT
AND POLISH PRODUCTION OUT OF CONCERN
FOR OUR ENVIRONMENT!

1.0 - Description of the company

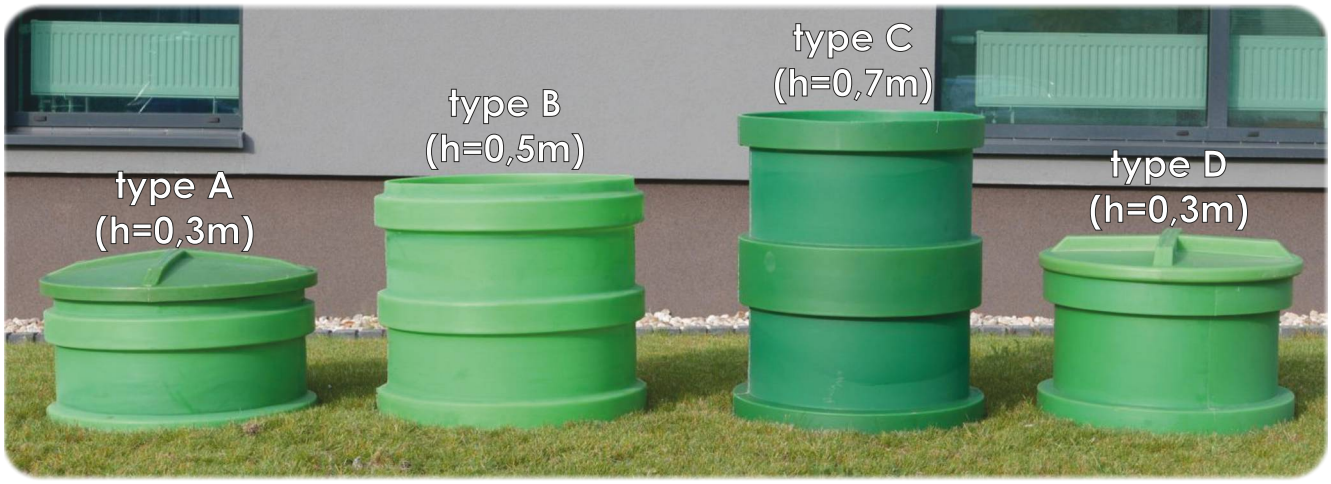
Company WOBET-HYDRET is currently engaged in the production of polyethylene (HDPE) products , including the folowing assortment:

- Biological sewage tratment plant (from 4 PE to 500 PE)
- Home sewatge treatment plant (from 4 PE to 50 PE)
- Putrefactive settling tanks (from 2m³ to 75m³)
- Drainless tanks (from 2m³ to 75m³)
- fire-prevention tanks (from 2m³ to 75m³)
- Reservoir tanks
- Grease separators
- Coalescent separators
- Coalescent separators with BY-PASS
- water meter well
- drainage catch pits
- drainage well
- soakways well
- sewage pump stations
- infiltrating systems

Wide circel of our recipients include national as well as foreign companies. We are trying to keep quality of our products on the higest level, and the wide technical back enables alteration of the offer in the structure, the purpose and the equipment. For many years we tied a lot of commercial cooperations with suppliers of top quality products, which we offer in our solutions:?

- SIEMENS
- SCHNEIDER ELECTRIC
- EATON
- WIELAND
- PHOENIX CONTACT
- TECH
- SECOH
- HIBLOW
- DANFOSS
- EBARA
- KSB
- GRUNDFOSS
- HYDRO-VACUUM
- JAFAR
- NOVITA
- INSTAL-PLAST
- SIMONA

1.0 - Realization (Photographs)



Settling tank 2m3, ST-4

Two types of gasket are available:
- NBP23 for A, B,
- NIP22 for C, D.

Bio. sewage tratment plant ZBS

Settling tank 3m3

Drainless tank(Double-wall)

Bio.sewage treatment plant ZBS i ZBB (Double-wall)

Modern, eco-friendly biopreparation being used for processing of sewers and impurities gathered in sewage treatment plants and septic tanks. Using preparation reduces most of unpleasant odors and aslo reduces hamful substances in social-welfare sewers.

Action: Under the influence of complex micro-organisms and enzymens a hastened natural neutralization and decomposition of pollutants is held in sewage treatment plants and septic tanks.

The greatest efficiency of bioproducts is achieved at temperature from about : +4°C to +30°C. With regular applying of biopreparation a frequency of pumping out impurity is reduced as well as amount of unpleasant smells.

Composition: Complex of effective micro-organisms, enzymes and nutritents. Number of living cells of micro-organismss, CFU/g, not fewer than $4{,}0x10^{9}$.

Applying and dosage: Preparing solution: dissolve required dose of biopreparation in 10L in warm non-chlorinated water. Store in room temperature for about 60 min. Pour solution into the toilet and pour plenty of water. The application should take place twice a month ,using required amount of biopreparation .

Initial dose	30 g or 4 measures for every 2 m^3* Volume of septic tank
Every 2 weeks	15 g or 1 measures for every 2 m^3* Volume of septic tank
Single measure (teaspoon) contains 10 g of biopreparation	

* for 3 m^3 proportionally more

Schedule of biopreparation dosing

m	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
week	1	1	1	1	1	1	1	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4	4	4	4	4

4.0 - Infiltrating systems

Depending on conditions and the configuration, it is possible to categorise sewage treatment plant systems in the following variants:

- infiltrating drainage on rinsed qravel (carried out in ground or embankment)
- Infiltrating drainage on packages with rinsed gravel as supplementing underlay (carried out in ground or embankment)
- soakway on rinsed gravel (regards bio. treatment plants)
- soakway on packages with rinsed gravel as supplementing underlay (regards bio. treatment plants)
- drainage to trench, watercourse, and the like. (regards bio. treatment plants)

Drain size is dependent on preceding equipment. it is also conected to treatment grade (in bio. sewage treatment plant) or semi-treatment (in putrefactive settling tank).

Implementation of the drain in the form drainage has several advantages:

- Large soaking surface,
- Uniform distribution through the system of infiltrating pipes,
- small difernce in depth (difrence between the level of sewage outlet from building and bottom of the dich, taking in acount layer of underlay),
- Possibility of making an embankment,at high permanent or periodic groundwater level.

Implementation of accompanying soakway in form (alogn with bio. sewage treatment platnt),is characterized by folowing:

- small footprint,
- fast implementation,
- posibility of draining to deeper and more permeable layers of ground.

In both described solutions,it is possible to use plastic infiltration packages:

- PRO-1R for infilitrating drainage,
- PRO-SCH for soakways.

Implementation of packages enables reduction in drainage size and amount of underlay (rinsed gravel), which functions as support for the system.

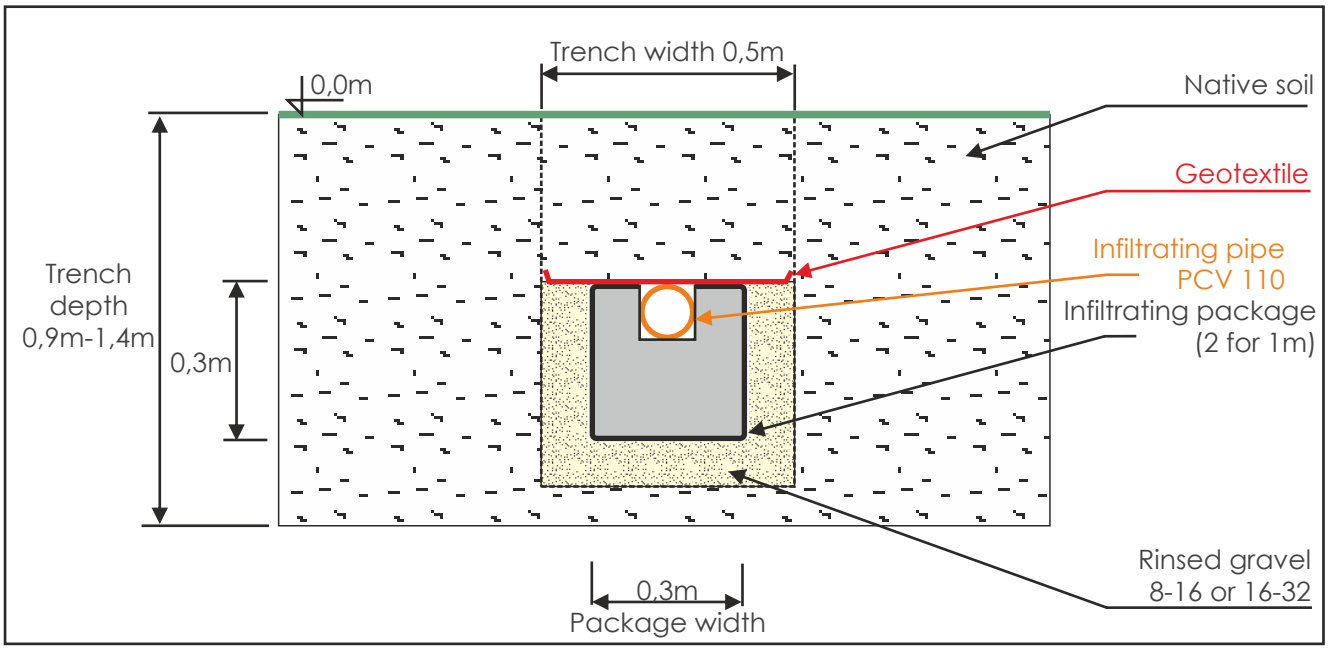
The table below shows examples of plant configurations with washed gravel underlay (16-32mm).

Number of users	Type of settling tank or bio.treatment	type and size for drainage
PE		m
≤ 4	2m³	48
≤ 4	ZBS-4C	48
≤ 5	ZBS-5C	48
≤ 6	3m³	60
≤ 6	ZBS-6C	48
≤ 6	ZBS-6C/KP	48
≤ 7	ZBB-7C	60
≤ 7	ZBS-7C/KP	60
≤ 8	4,5m³	96
≤ 8	ZBS-8C	60
≤ 8	ZBS-8C/KP	60
≤ 10	5m³	120
≤ 10	ZBB-10C	72
≤ 10	ZBS-10C	72
≤ 10	ZBS-10C/KP	72
≤ 12	ZBB-12C	96
≤ 12	ZBS-12C	96
≤ 16	ZBB-16C	120
≤ 16	ZBS-16C	120
≤ 20	ZBB-20C	144
≤ 20	ZBS-20C	144

The table below shows examples of plant configurations with infiltrating packages

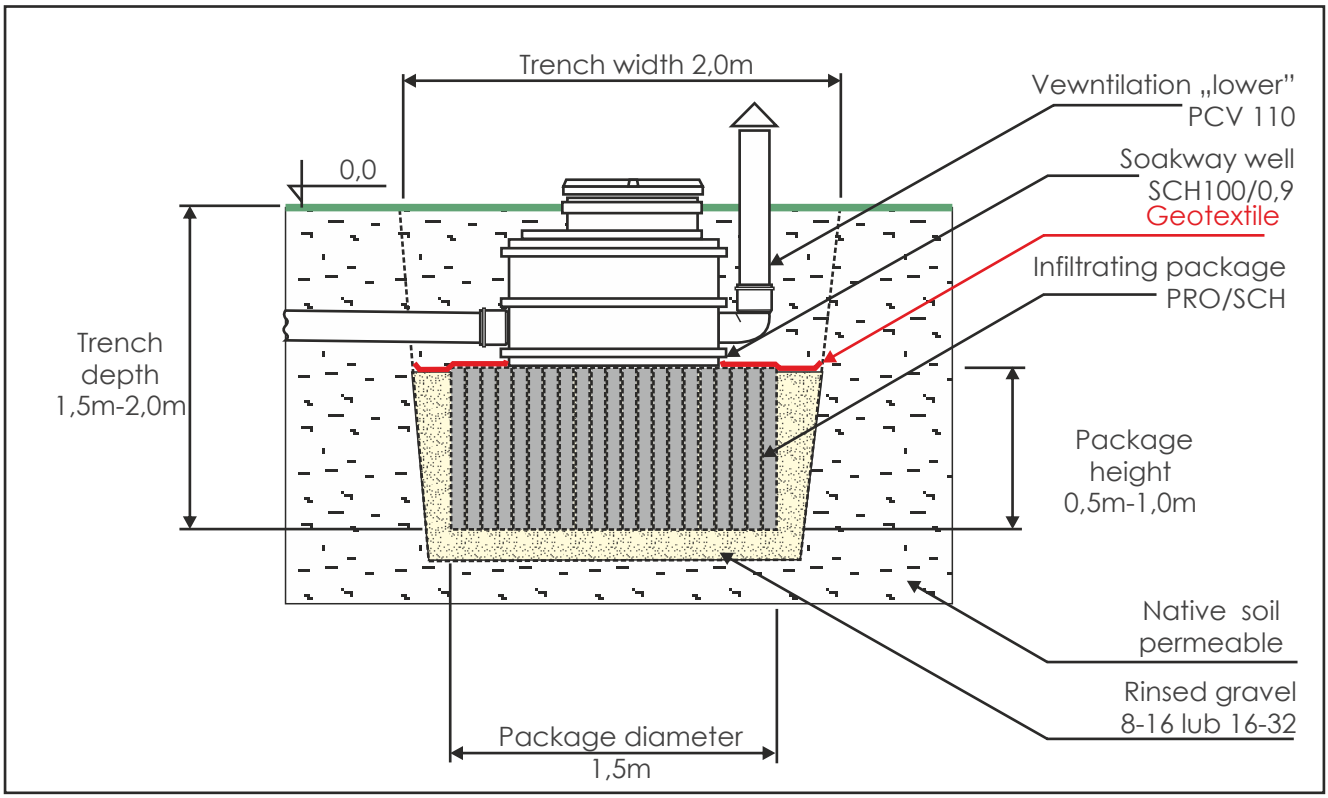
Number of users	Type of settling tank or bio.treatment	type and size for drainage
PE		m
≤ 4	2m³	24 - pack.
≤ 4	ZBS-4C	18 - pack.
≤ 5	ZBS-5C	24 - pack.
≤ 6	3m³	36 - pack.
≤ 6	ZBS-6C	24 - pack.
≤ 6	ZBS-6C/KP	24 - pack.
≤ 7	ZBB-7C	36 - pack.
≤ 7	ZBS-7C/KP	36 - pack.
≤ 8	4,5m³	48 - pack.
≤ 8	ZBS-8C	36 - pack.
≤ 8	ZBS-8C/KP	36 - pack.
≤ 10	5m³	60 - pack.
≤ 10	ZBB-10C	48 - pack.
≤ 10	ZBS-10C	48 - pack.
≤ 10	ZBS-10C/KP	48 - pack.
≤ 12	ZBB-12C	48 - pack.
≤ 12	ZBS-12C	48 - pack.
≤ 16	ZBB-16C	72 - pack.
≤ 16	ZBS-16C	72 - pack.
≤ 20	ZBB-20C	84 - pack.
≤ 20	ZBS-20C	84 - pack.

CROSS SECTION OF THE MODEL INFILTRATING PACKAGE PRO-1R FOR DRAINAGE



It should be noted that the method of assembling the packagespresented in the drawings applies to soils with medium or low permeability. In other types of soil, changes may be made to the method of installation, which must be agreed with the site manager and approved by system designer.In addition to standard packages,packages with larger dimensions can be offered on request

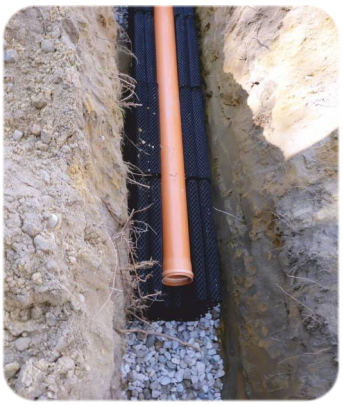
CROSS SECTION OF THE MODEL INFILTRATING PACKAGE FOR SOAKWAY



4.0 - Infiltrating systems

Elements from which the drainage can be configured:

- SCH100 single-wall soakway (HDPE) (as the crowning - the main inspection of the underlay or packages) with a diameter of 1.0 m and a height of 0.9 m (SCH100/0,9) and 1,7m (SCH100/1,7)
- infiltrating packages for soakway of diameter 1,2m (PRO/SCH120) and 1,5m (PRO/SCH150)
- infiltrating pipes PCV110, available in standard version (for sets with drainage on rinsed igravel)and reinforced (incised pipe SN 8 for sets with infiltrating packages PRO)
- geotextile, from NOVITA, type HTS, available in width 0,5m (for drainage on rinsed gravel) and 1,0m (for drauinage on packages PRO)
- single-wall drainage well (HDPE), 1m high, offered as distributtors with different amount of outputs: 3 (SR-3), 4 (SR-4) and 5 (SR-5)
- drainage well (HDPE) - distributors with posibility of taking samples or equiped with additional filter, offered in version with 3 outputs(SR-3P)



Drainage Lenght	Type of Drainage well	Amount/Lenght of drainage
m		pcs. x m
18	SR-3, SR-3P	2 x 9
24	SR-3, SR-3P	2 x 12
24	SR-3, SR-3P	3 x 8
36	SR-3, SR-3P	3 x 12
48	SR-3, SR-3P	3 x 16
48	SR-4	4 x 12
60	SR-3, SR-3P	3 x 20
60	SR-4	4 x 15
60	SR-5	5 x 12
72	SR-3, SR-3P	3 x 24
72	SR-4	3 x 18
84	SR-4	4 x 21
96	SR-4	4 x 24
120	SR-5	5 x 24

The product has the following certificates:

Drainage pipes
National Technical Assesment: **ITB-KOT-2018/0606**
Infiltrating packages PRO
National Technical Assesment: **ITB-KOT-2018/0370**, Hygenic certificate: **BK/W/0338/02/2018**
soakway
National Technical Assesment: **ITB-KOT-2018/0417**, Hygenic certificate: **BK/W/0338/02/2018**
draingae well
National Technical Assesment: **ITB-KOT-2018/0401**, Hygenic certificate: **BK/W/0338/03/2018**

Notepad

5.0 - Putrefactive settling tanks

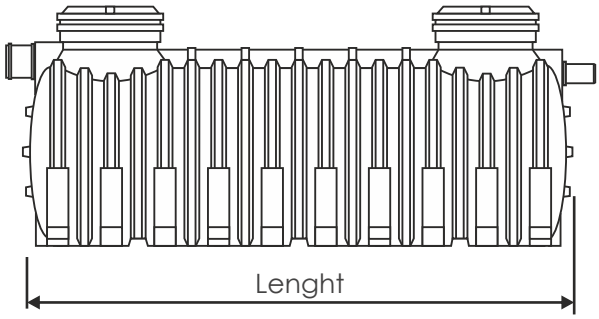
Settling taks perform role of preliminary settling in house sewage treatment plants. They are the first element on the way of sewage inflow.

Basic functions of settling tank and the processes taking place in it:

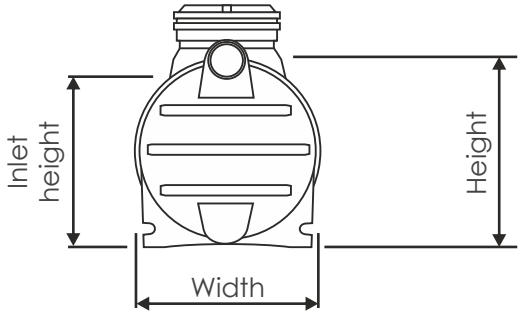
- Storing sewage load, suplied in very uneven vay.
- Sedymentation (particles deposition),
- flotation (flotation of lighter particles, e.g. oils, fats),
- anaerobic digestion (i.e. the decomposition of substances in the waste water.)

The processes taking place in the settling tank result in the formation of gases that must be discharged to the high ventilation in the building (e.g. through a sewage riser or separate ventilation).

The processes taking place in the settling tank and the treatment of wastewater are performed with the participation of micro-organisms and enzymes, which are introduced into this environment by means of approproate biopreparations.



view of the long side of the tank



view on the shorter side of the tank

The product has
the following certificates:

Compliance with the standard:
PN-EN 12566-1:2004/A1:2006

Hygienic Certificate:
BK/W/0338/02/2018

Tank Capacity	Daily max. Throuput	Inlet Height	Height	Lenght	Number of chambers	Plastic drain filter
m^3	m^3/d	m	m	m		
2	0,60	1,05	1,2	2,2	1-2	yes
3	0,90	1,05	1,2	3,3	1-2	yes
3,5	1,05	1,16	1,4	3,2	1-2	yes
4,5	1,50	1,36	1,6	3,5	1-2	yes

5.0 - Putrefactiver settling tanks

The company offers the following types of single-walled settling tanks:

- Single-chamber
- Double-chamber

Single-chamber settling tanks are used in the smallest and simplest solutions, e.g. as the first element of a household sewage treatmentplant followed by drainage. As standard, they are equipped with two inspection hatches and a plastic filter at the outlet.

Two-chamber settling tanks are more effective.The division into chambers also protects the filter in the event of accumulating a large amount of sewage.

They are used analogously to single-chamber versions, but can also be part of more complex (biological) systems. As standard, they are equipped with two inspection hatches and a plastic filter at the outlet.

The table below presents an example of selection of settling tanks in a sewage treatment plant on rinsed gravel underlay with fraction of 16-32 mm.

Number of users	Septic tank type	Type and size of drainage
PE		m
≤ 4	2m³	48
≤ 6	3m³	60
≤ 8	4,5m³	96
≤ 10	5m³	120

The table below presents an example of selection of settling tanks in a sewage treatment plant on infiltrating packages PRO-1R.

Number of users	Septic tank type	Type and size of drainage
PE		m
≤ 4	2m³	24 - pack.
≤ 6	3m³	36 - pack.
≤ 8	4,5m³	48 - pack.
≤ 10	5m³	60 - pack.

5.0 - Double-wall putrefactive settling tanks

Double-wall putrefactive settling tanks constitute the supplement to series of single-wall settling tanks. They are characterized by a greater endurance as well as a greater scope of available capacities.

Double-wall settling tanks, they are also available in three-chamber version . It is the most advanced designn of series, which has the higest efficiency for this type of solution.

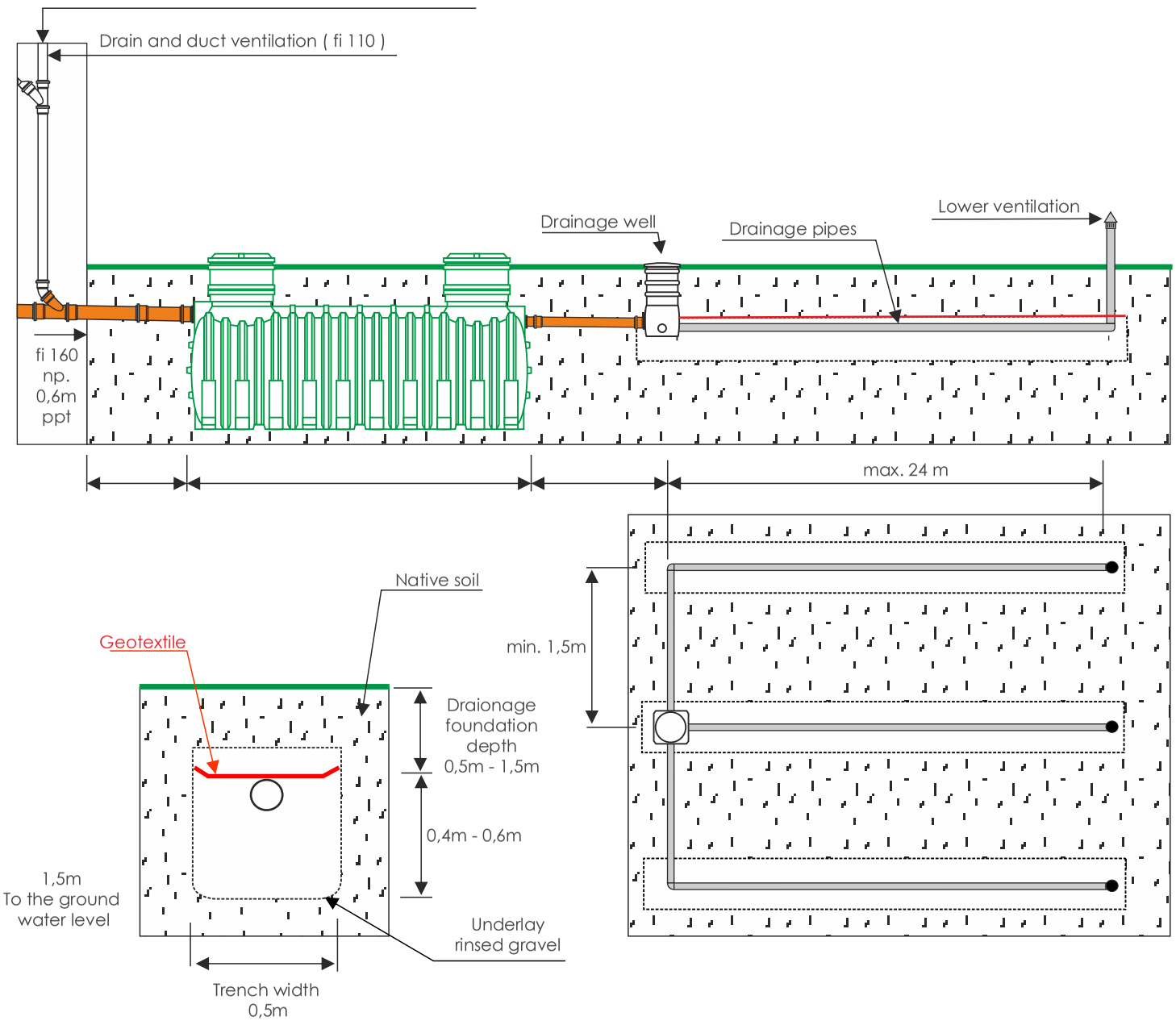
Models with small capacities are used when a considerable installation depth or high groundwater level make it difficult or impossible to install a single-wall settling tank in accordance with the instruction.

Large-capacity settling tanks are usually part of more complex biological treatment plant systems. The choice of capacity, number and size of chambers and the manner of their production is determined by the designer. The advantages of such a settling tank structure also include possibility of using hatches with larger diameter 80cm, instead of standard ones 60cm. However, this applies to diameter of the body not less than 1.5m.

Double-wall settling tanks can, as standard, be covered with a 1,0m layer of ground (for body diameter of 1,2m and 1,5m).

The offer also includes settling tanks with larger diameters (2.0 -2.5m) and capacty of up to 75m^3 ,however they are manufactured on request and according to durability requirements specified by the contracting authority or project. Which may allow for greater depth of construction.

The drawing shows a connection variant in case when the building has properly mounted high ventilation.



The minimum distance for sewage tanks and treatment plants form other buildings:

- 2m from the plot border, public road or pavement.

- 5m from windows and exterior doors to the rooms designated to accomodate people.

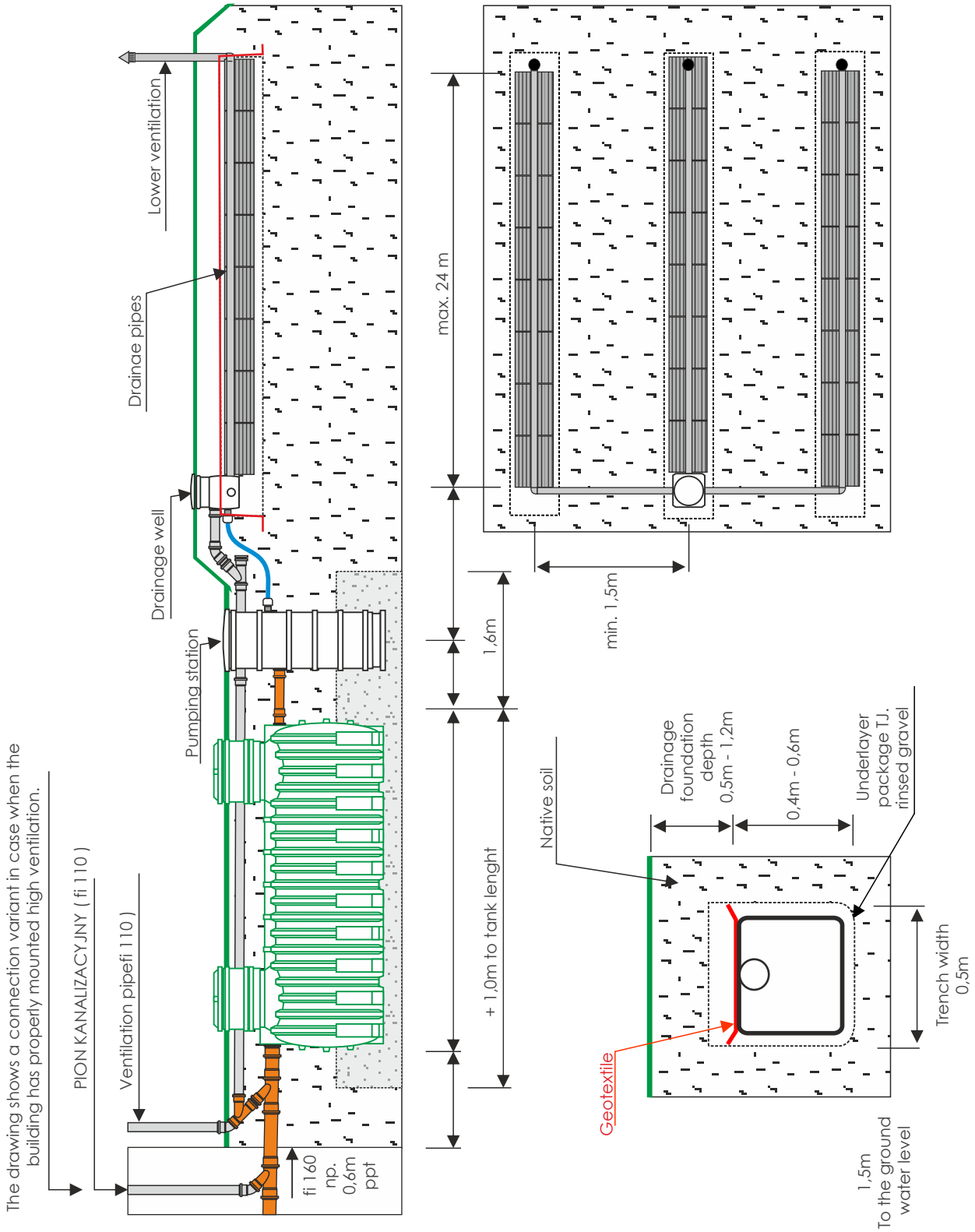
- 1,5m from drainage to the highest groundwater level.

Well constituting a drinking water shoud be according to the same regulations away at least:

- 15m from tanks collecting waste (settling,cesspools) and similar sealed containers.

- 30m (70 m) from infiltrating drainage

(packages in the embankment)



7.0 - Pump stations

The range of the pumping station's offer includes both tanks and complete sewage and polluted water pumping stations.

Sewage pumps are available with VORTEX type impellers with 50mm of free passage. Pumps with grinder are available as an option.

Pumping station can be equipped with auto-couplin(Recommended), which largely streamlines maintenance and service . Available are also protection, protection/alarm(with additional float) and control boxes. In two-pump version, the control takes place via PLC programer with LCD displat,to which three float switches are connected.

Standard EBARA pumps types:

- OPTIMA MA (1-phaze) 0,25kW
- BEST ONE VOX MA (1-phaze) 0,25kW
- BEST 2 MA (1-phaze) 0,55kW
- RIGHT 75 MA (1-phaze) 0,55 kW
- RIGHT 100 MA (1-phaze) 0,75 kW

- DW VOX 75 MA (1-phaze) 0,55kW
- DW VOX 100 MA (1-phaze) 0,75kW
- DW VOX 150 MA (1-phaze) 1,10 kW

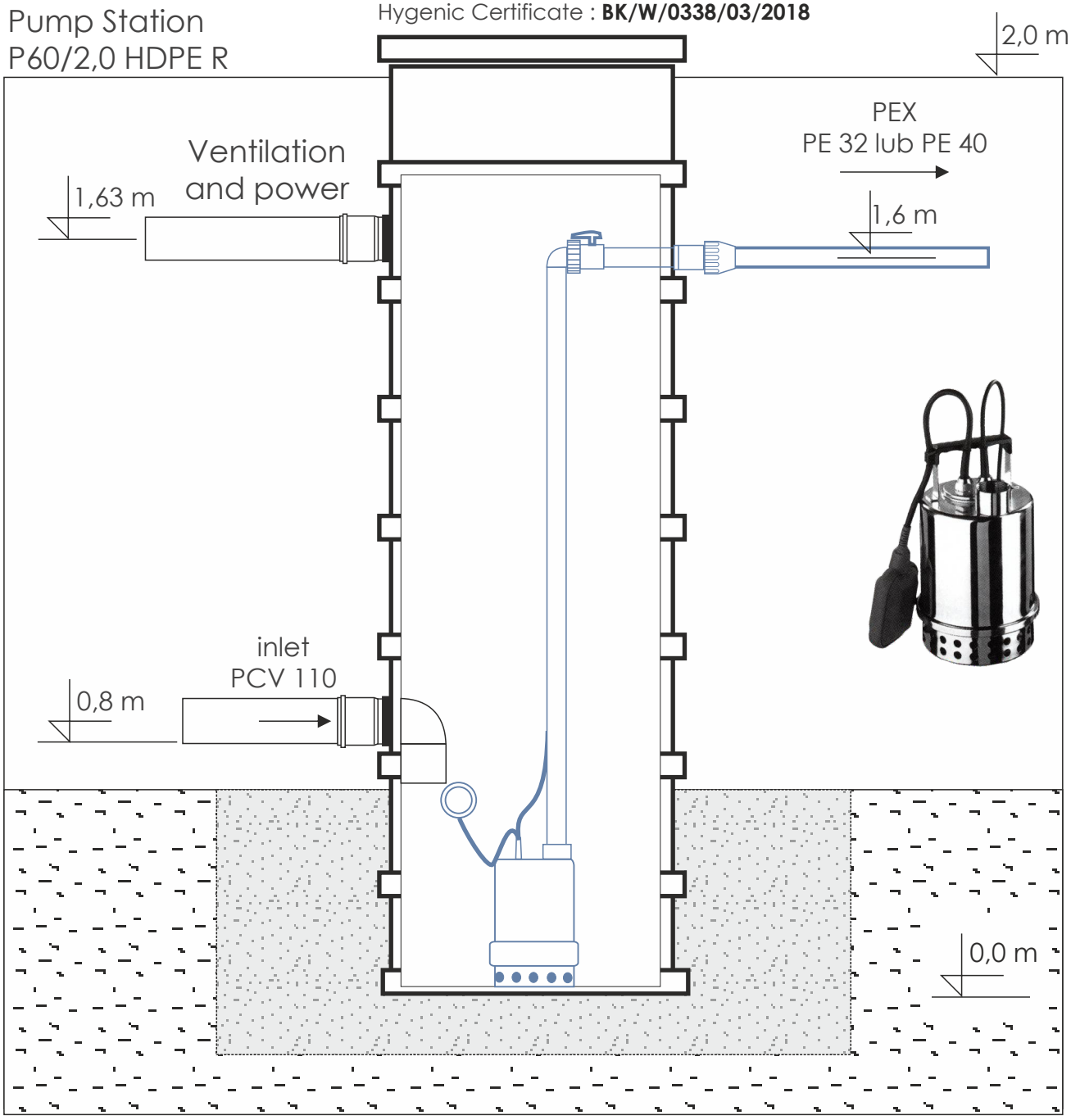
- DW VOX 200 (3-phaze) 1,50 kW
- DW VOX 300 (3-phaze) 2,20 kW

Type	chamber diameter	extension diameter	Manhole diameter	Optional steel manhole	Height	Construction
	m	m	m	m	m	
P60 HDPE R	0,6	0,6	0,6	-	1,4 / 2,0	Single-wall
P60-80 HDPE R	0,8	0,8	0,6	-	2,1	Single-wall
P100 HDPE R	1,0	1,0	0,6	-	1,9	Single-wall
P120 HDPE R	1,2	1,2	0,6	-	1,8	Single-wall

Type	chamber diameter	extension diameter	Manhole diameter	Optional steel manhole	Height	Construction
	m	m	m	m	m	
P100 HDPE Z	1,0	1,0	0,6	-	2,0 - 5,5	Double-wall
P120 HDPE Z	1,2	1,2	0,6	0,7 x 0,8	2,0 - 5,5	Double-wall
P150 HDPE Z	1,5	1,5	0,6	0,7 x 0,8	2,0 - 5,5	Double-wall
P200 HDPE Z	2,0	2,0	0,6	0,7 x 0,8	2,0 - 5,5	Double-wall

The procuct has the following certificates:
Compliance with standard: **PN-EN 12050-1, PN-EN 12050-2**
Hygenic Certificate : **BK/W/0338/03/2018**

Pump Station
P60/2,0 HDPE R

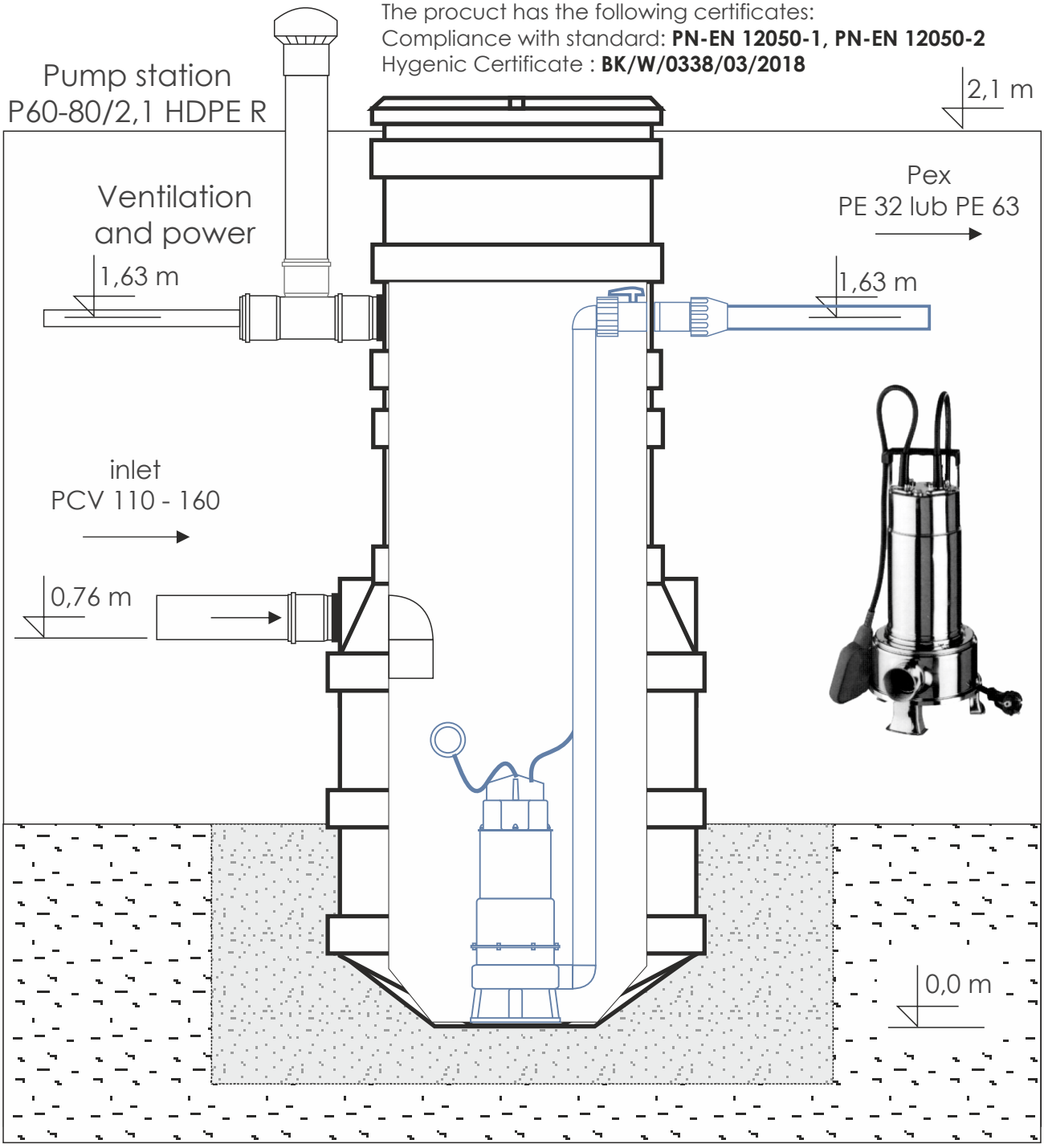


Type	Chamber diameter	extension diameter	Manhole diameter	Height	inlet / outlet	Construction
	m	m	m	m	mm	
P60/1,4 HDPE R	0,6	0,6	0,6	1,4	110 / 32-50	single-wall
P60/2,0 HDPE R	0,6	0,6	0,6	2,0	110 / 32-50	single-wall

Pump examples	Free passthrough	Wattage / Amperage	Performance / Lifting					
	mm	kW / A	l/min / m					
OPTIMA MA	10	0,25 / 1,9	40 / 6,5	80 / 5,2	120 / 3,3	-	-	-
BEST 2 MA	10	0,55 / 4,4	40 / 11,5	80 / 9,8	120 / 8,3	160 / 6,7	200 / 5,0	240 / 2,9

7.1 - Pump stations

The procuct has the following certificates:
Compliance with standard: **PN-EN 12050-1, PN-EN 12050-2**
Hygenic Certificate : **BK/W/0338/03/2018**

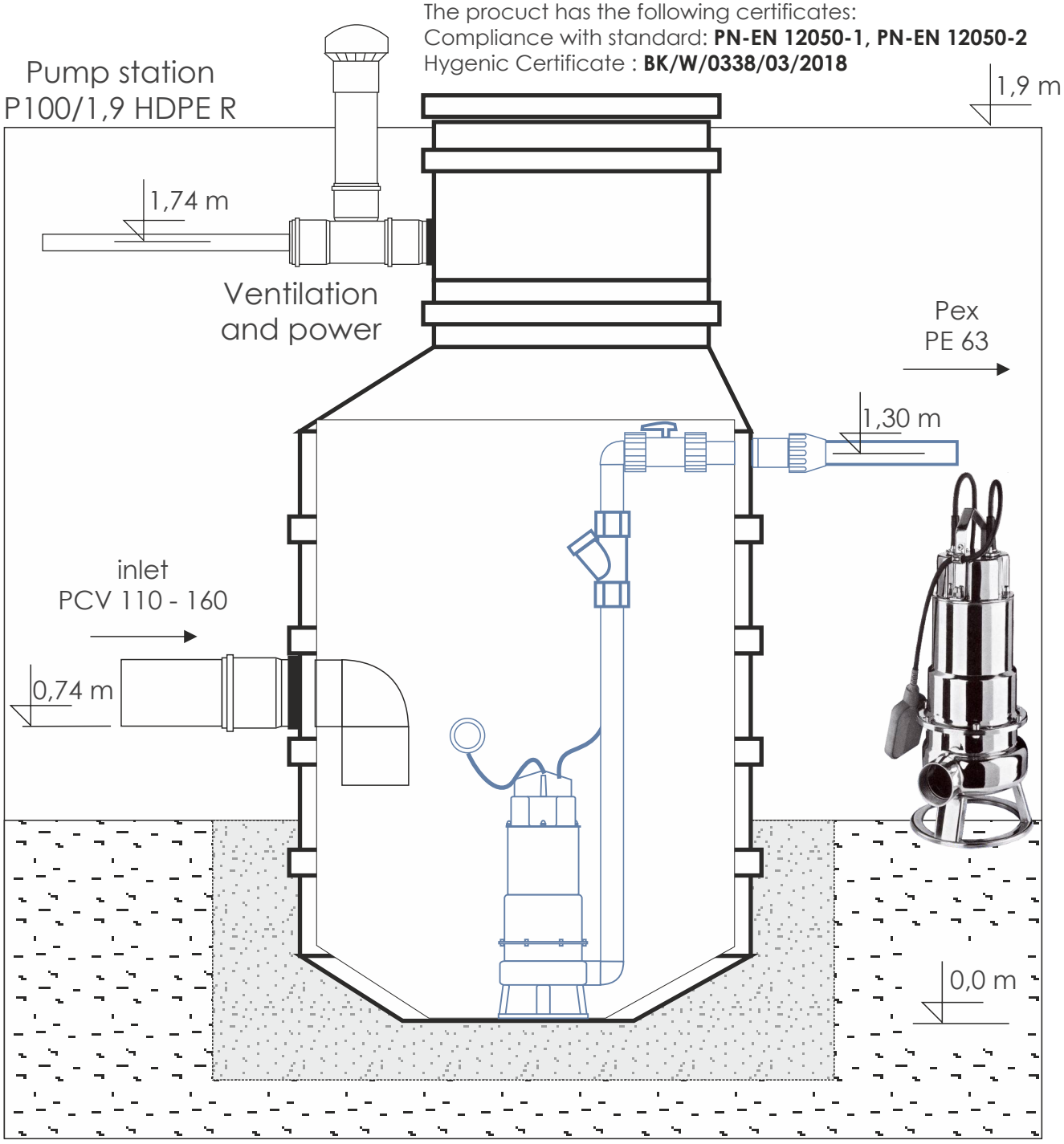


Type	Chamber diameter	extension diameter	Manhole diameter	Height	inlet / outlet	Constrution
	m	m	m	m	mm	
P60-80/1,5 HDPE R	0,8	0,6	0,6	1,5	110 / 32-63	Single-wall
P60-80/2,1 HDPE R	0,8	0,6	0,6	2,1	110 / 32-63	Single-wall

Pump examples	Free passthrough	Wattage / Amperage	Performance / Lifting					
	mm	kW / A	l/min / m					
OPTIMA MA	10	0,25 / 1,9	40 / 6,5	100 / 4,2	-	-	-	-
RIGHT 100MA	35	0,75 / 5,7	40 / 9,5	100 / 8,1	200 / 5,4	300 / 2,0	-	-
DW VOX 100MA	50	0,75 / 5,8	40 / 8,6	100 / 7,9	200 / 6,7	300 / 5,3	400 / 3,7	500 / 1,9

7.1 - Pump station

The procuct has the following certificates:
Compliance with standard: **PN-EN 12050-1, PN-EN 12050-2**
Hygenic Certificate : **BK/W/0338/03/2018**

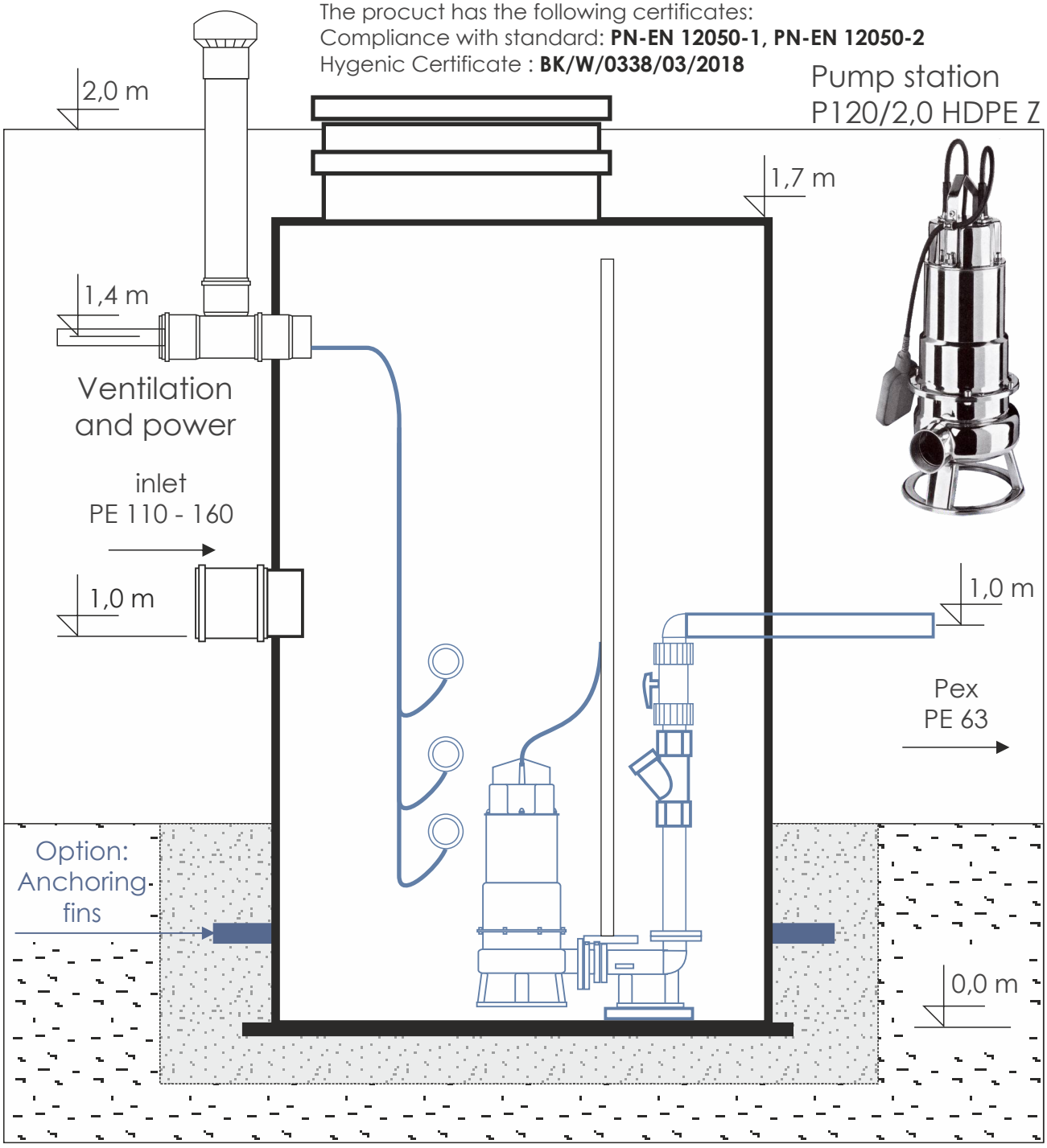


Type	Chamber Diameter	extension Diameter	Manhole Diameter	Height	inlet / outlet	Constrution
	m	m	m	m	mm	
P100/1,9 HDPE R	1,0	0,6	0,6	1,9	160 / 63-75	single-wall
P120/1,8 HDPE R	1,2	0,6	0,6	1,8	160 / 63-75	single-wall

Pump examples	Free passthrough	Wattage / Amperage	Performance / Lifting					
	mm	kW / A	l/min / m					
DW VOX 100MA	50	0,75 / 5,8	100 / 7,9	200 / 6,7	300 / 5,3	400 / 3,7	500 / 1,9	-
DW VOX 150MA	50	1,10 / 7,3	100/10,2	200 / 9,0	300 / 7,6	400 / 6,1	500 / 4,1	600 / 2,1
DW VOX 200 (3-F)	50	1,50 / 3,3	100/12,5	200/11,2	300 / 9,8	400 / 8,3	500 / 6,4	600 / 4,2

7.2 - Double-wall pump station

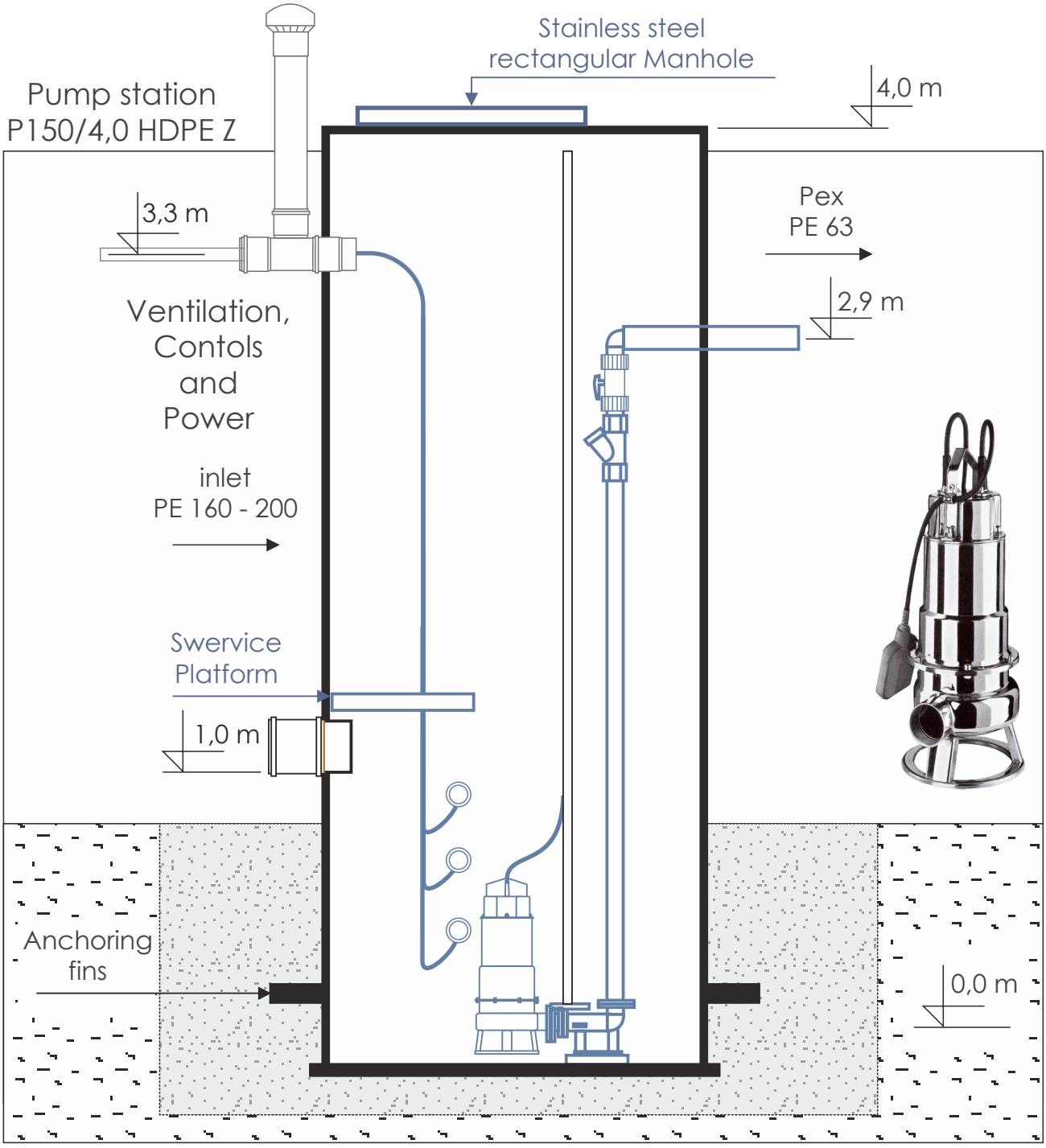
The procuct has the following certificates:
Compliance with standard: **PN-EN 12050-1, PN-EN 12050-2**
Hygenic Certificate : **BK/W/0338/03/2018**



Type	Chamber diameter	extension diameter	Manhole diameter	Height	inlet / outlet	Constrution
	m	m	m	m	mm	
P100 HDPE Z	1,0	1,0	0,6	2,0-5,5	160 / 63-90	Double-wall
P120 HDPE Z	1,2	1,2	0,6	2,0-5,5	160 / 63-110	Double-wall

Pump examples	Free passthrough	Wattage / Amperage	Performance / Lifting					
	mm	kW / A	l/min / m					
DW VOX 100MA	50	0,75 / 5,8	100 / 7,9	200 / 6,7	300 / 5,3	400 / 3,7	500 / 1,9	-
DW VOX 150MA	50	1,10 / 7,3	100/10,2	200 / 9,0	300 / 7,6	400 / 6,1	500 / 4,1	600 / 2,1
DW VOX 200 (3-F)	50	1,50 / 3,3	100/12,5	200/11,2	300 / 9,8	400 / 8,3	500 / 6,4	600 / 4,2

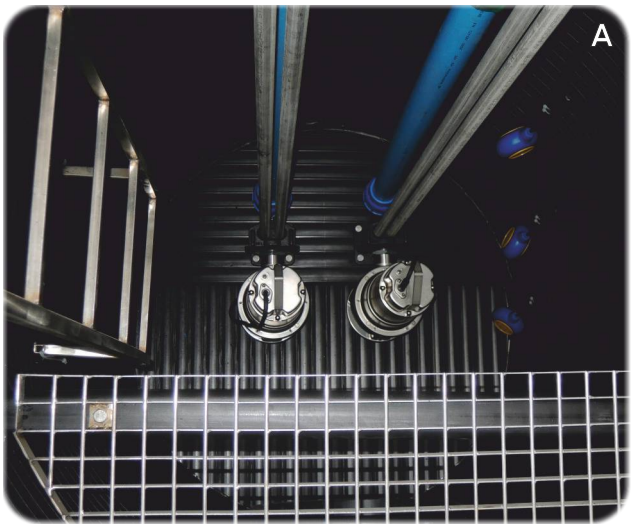
7.2 - Double-wall pump station

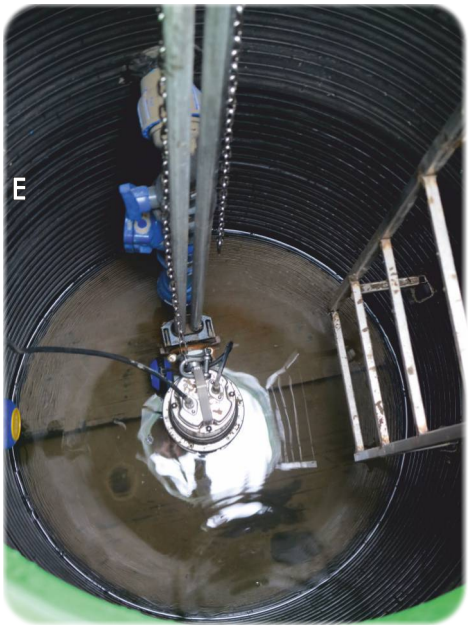


Type	Chamber diameter	extension diameter	steel manhole	Height	inlet / outlet	Construction
	m	m	m	m	mm	
P120 HDPE Z	1,2	1,2	0,7 x 0,8	2,0-5,5	160 / 63-110	Double-wall
P150 HDPE Z	1,5	1,5	0,7 x 0,8	2,0-5,5	160 / 63-110	Double-wall

Pump examples	Free passthrough	Wattage / Amperage	Performance / Lifting					
	mm	kW / A	l/min / m					
DW VOX 150MA	50	1,10 / 7,3	100/10,2	200 / 9,0	300 / 7,6	400 / 6,1	500 / 4,1	600 / 2,1
DW VOX 200 (3-F)	50	1,50 / 3,3	100/12,5	200/11,2	300 / 9,8	400 / 8,3	500 / 6,4	600 / 4,2
DW VOX 300 (3-F)	50	2,20 / 4,4	100/15,7	200/14,7	300/13,9	400/12,6	500/10,7	600 / 8,4

7.3 - Pump station (Photographs)





Description:
HDPE Z:
A - P150
B - P150
C - P100
D - P100
E - P100

HDPE R:
F - P100
G - P60
H - P60-80

7.3 - Control and safety boxes in pumping stations

When investing in a sewwage pumping station, it is worthusing additional safeguards that comprehensively protect the pump or pump system.

Examples types of protections for pumping stations:

- Alarm boxes with an additional float switch,
- Security boxes (necessary minimum),
- Security and alarm boxes with an additional float switch,
- Control boxes (Single-pump) with three float switches,
- Control boxes with a PLC logic module and information display (two-pump) and thre float switches,
- control boxes with a PLC logic module and an information display as well as a GSM moldule (remote information on emergency states) and three float switches.

A protective box (with a pump motor switch) in a 6-module casing with IP 65 rating.

Protection and alarm box (with shock protection in the form of a RCD circuit breaker and a pump motor swich). Additionaly, it is equipped with a light and sound alarm.
12-module casing with IP 65 rating.
single float switch is connected to the device.

Alarm box (with electric shock protection in the form of a residual current breaker). Additionally equiped with light and sound alarm. in a 6-module casing with IP 65 rating. The box is used in pumping stations as well as in outlet and retention tanks.

Control box (with electric shock protection in the form of a RCD circuit breaker and a pump motor switch). Additionally equiped with a light and sound alarm, and mode switch.
18-module casing with IP 65 rating.
three float switches are connected to the box.

7.3 - Control and protection boxes in pumping stations

Control box for 2 single-phase pumps (with electric shock protection in form of RCD and pump motor circuit breaker for both pumps). Equiped with a warning light, operating mode switch, PLC controller with information display, three float switches enclosed in a 24-module housing with IP 65 rating

Equipment	Protection box	Protection and alarm box	control box single pump	control box doube pump
number of modules / IP Rating	6 mod / IP 65	12 mod / IP 65	18 mod / IP 65	24 mod (1-faz.), 36 mod (3-1az.)/ IP 65
RCD circuit breaker (anti-shock)	-	+	+	+
controller with information display	-	-	-	+
Pump motor switch	+	+	+	+
Warning light (LED)	+	+	+	+
Audible alarm	-	+	+	-
Pump operation switch	-	-	+	+
Pump alternation	-	-	-	+
Number of float switches connected	-	1	3	3
GSM module (optional)	+	+	+	+
Availability of 1-phase version	+	+	+	+
Availability of 3-phase version	-	-	+	+

Control box for 2 single-phase pumps (with electric shock protection in form of RCD and pump motor circuit breaker for both pumps). Equiped with a warning light, operating mode switch, PLC controller with information display and GSM module(remote notification of malfunction), three float switches enclosed in a 36-module housing with IP 65 rating

Control box for 2 three-phase pumps (with electric shock protection in form of RCD and pump motor circuit breaker for both pumps). Equiped with a warning light, operating mode switch,Phase controler (loss and phase order) PLC controller with information display , three float switches enclosed in a 36-module housing with IP 65 rating

8.0 - Grease separator

Too much grease in sewage systems causes fouling of pipes and a significant reduction in their flow. In addition, as a result of the biological decomposition o fat, corrosive fatty acids with an unpleasant odor are formed. Thefore, it is nescessary to use grease separators in places of their excesive formation, e.g:

- Catering establishments (e.g. bars, restaurants, etc.)
- Hotels with a restaurenat
- Schools and kindergartens with a canteen
- Wedding halls,
- Food industry (e.g. meat and fish processing plants, slaughterhouses, etc.)

Grease separator works on the principles of :

- Flotation (the flow of substances lighter than water like greases acumulate on surface)
- Sedimentation (the fall of substances heavier than water accumulate them on the bottom).

The series grease separators include three types of design solutions:

- Vertical with single-wall construction for objects with low or medium grease load in sewage
- Horizontal with single-wall construction for objects with medium or high grase load in sewage
- Horizontal with double-wall construction for facilities with high grease load in sewage and for instalations in difficult conditions

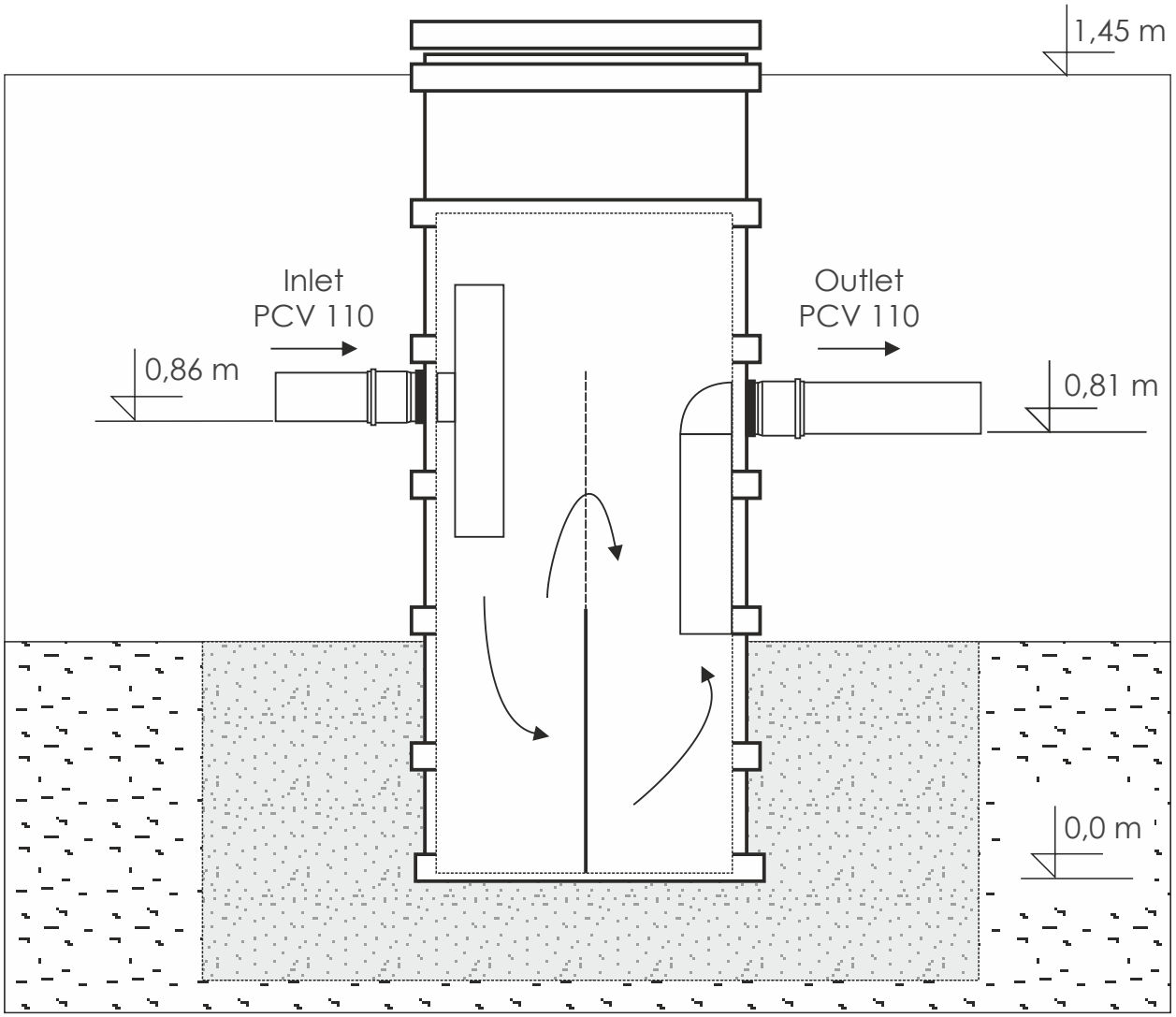
Separator Type	Nominal Flow	Tank Capacity	Vol. of Oil gathered	Lenght	Diameter	Height	Number of manholes	Type	Construction
	l/s	m³	m³	m	m	m			
ST-05	0,5	0,1	0,03	-	0,6	1,4	1	vertical	Single-wall
ST-2	2	0,3	0,12	-	1,0	1,9	1	vertical	Single-wall
ST-3	3	0,4	0,17	-	1,2	1,8	1	vertical	Single-wall
ST-4	4	0,8	0,31	2,2	1,2	-	2	horizontal	Single-wall
ST-7	7	1,4	0,55	3,7	1,2	-	2	horizontal	Double-wall
ST-10	10	2,0	0,83	5,5	1,2	-	2	horizontal	Double-wall
ST-15	15	3,0	1,20	6,0	1,5	-	2	horizontal	Double-wall

Separator Type	Daily amount of meals served		Weekly amount of processed livestock (meat processing plants)
	Restaurant	Hotel	
ST-05	25	50	-
ST-2	100	220	-
ST-3	150	330	-
ST-4	200	440	9 GV (e.g. cows)
ST-7	360	770	18 GV (e.g. cows)
ST-10	520	1100	26 GV (e.g. cows)
ST-15	780	1650	40 GV (e.g. cows)

The product has the following declarations of compliance with the standard:
PN-EN 1825-1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

8.1 - Single-wall Grease separators

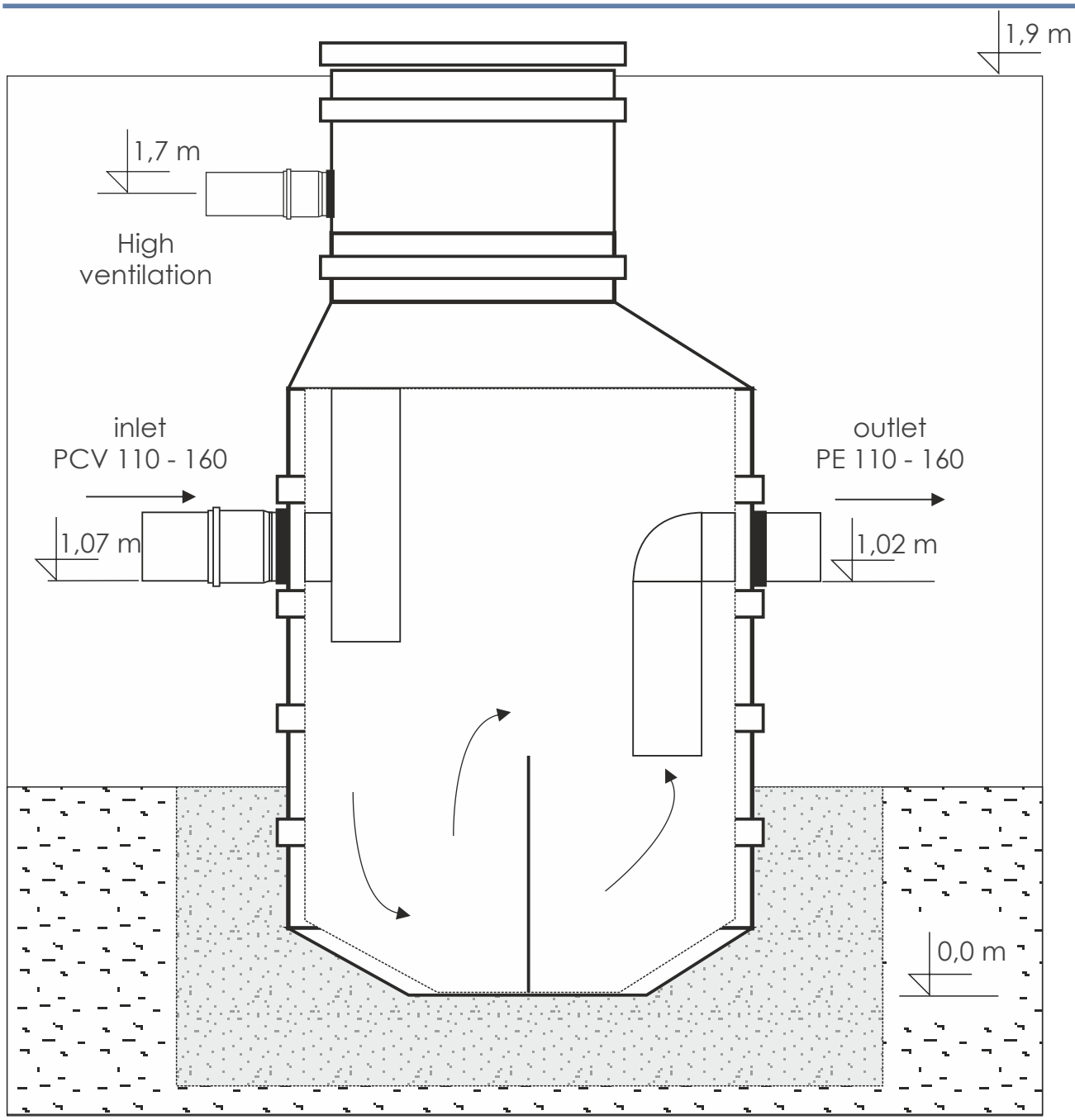


The product has the following declarations of compliance with the standard:
PN-EN 1825-1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

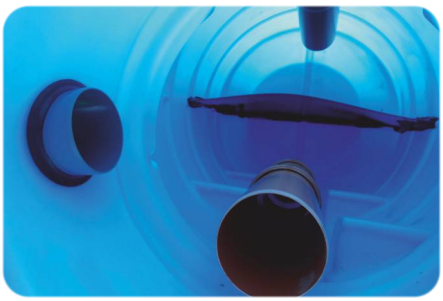
Separator Type	Nominal Flow	Tank Capacity	Vol. of Oil gathered	Diameter	Height	Construction
	l/s	m^3	m^3	m	m	
ST-05	0,5	0,1	0,03	0,6	1,4	Single-wall

8.1 - Single-wall Grease separators



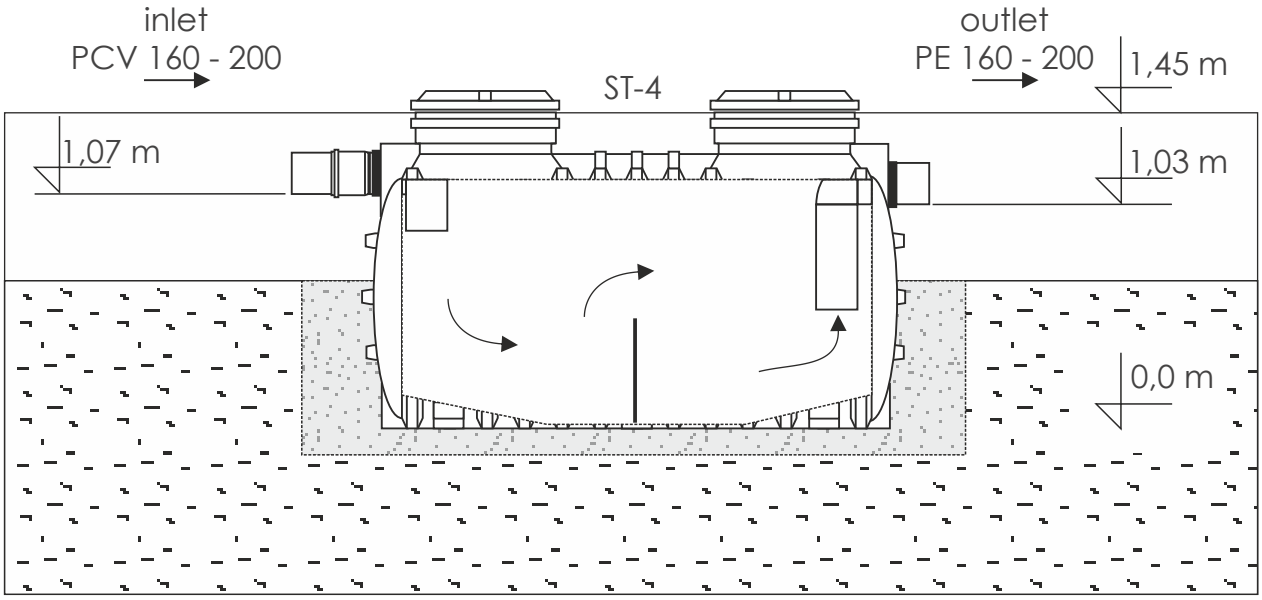
The product has the following declarations of compliance with the standard:
PN-EN 1825-1:2007

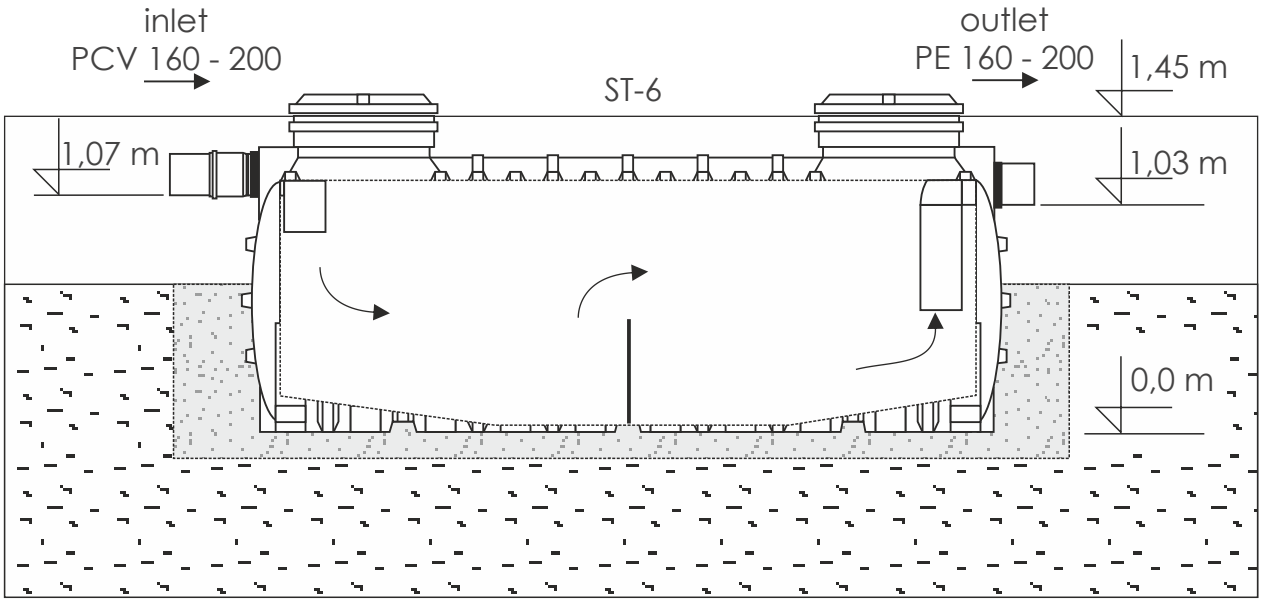
The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018



Separator Type	Nominal Flow	Tank Capacity	Vol. of Oil gathered	Diameter	Height	Construction
	l/s	m^3	m^3	m	m	
ST-2	2	0,3	0,12	1,0	1,9	Single-wall
ST-3	3	0,4	0,17	1,2	1,8	Single-wall

8.1 - Single-wall Grease separators



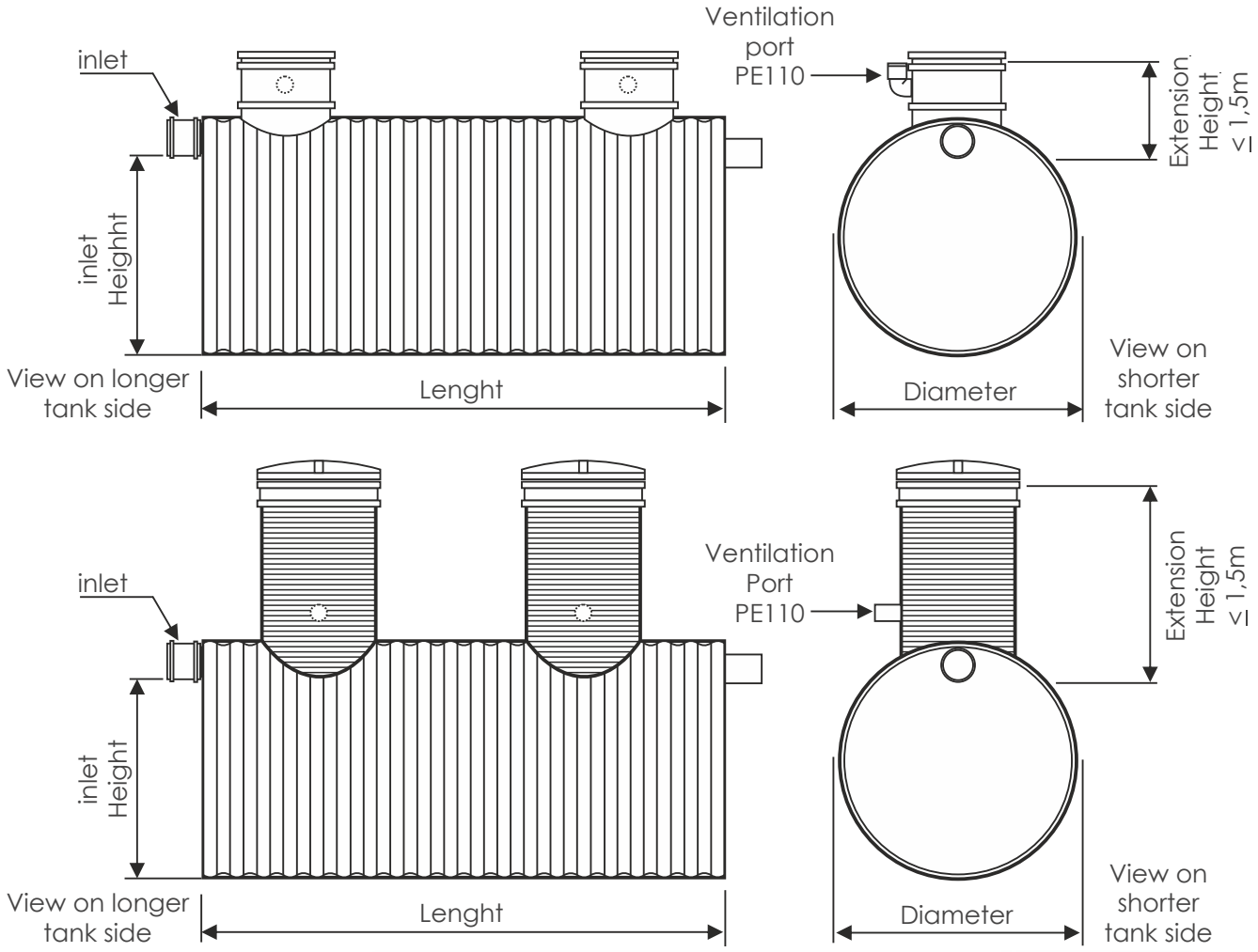


The product has the following declarations of compliance with the standard:
PN-EN 1825-1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

Separator Type	Nominal Flow	Objętość osadnika	Vol. of Oil gathered	Lenght	Width/ Height	Konstrukcja
	l/s	m^3	m^3	m	m	
ST-4	4	0,8	0,31	2,2	1,2/1,2	Single-wall
ST-6	6	1,2	0,48	3,3	1,2/1,2	Single-wall
ST-7	7	1,4	0,56	3,5	1,2/1,6	Single-wall

8.2 - Double-wall Grease separators



The product has the following declarations of compliance with the standard:
PN-EN 1825-1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

Separator Type	Nominal Flow	Tank Capacity	Vol. of Oil gathered	Lenght	Diameter	Diameter of the inspection manhole for height ≤ 1,5m / ≥	Construction
	l/s	m^3	m^3	m	m	m	
ST-7	7	1,4	0,55	3,7	1,2	0,6	Double-wall
ST-10	10	2,0	0,83	5,5	1,2	0,6	Double-wall
ST-15	15	3,0	1,20	6,0	1,5	0,6 / 0,8(recommended)	Double-wall

9.0 - Coalescing separators

Coalescence separators are devices designed for installation before dischargwe into rainwater drainage system water that may contain petroleum pollutants.

Separators are integrated as standard with a settling tank(sand trap) and are equipped with a filter with a coalescing cartridge.

The rntire flow takes place through the separator and its amount is determined as nominal for given configuration (i.e filter size and settling tank capacity).

Coalescence separators are intended for :

- catchment areas of small and medium area,
- catchment areas with a lot of pollution (e.g. gas stations, car washes, etc.)

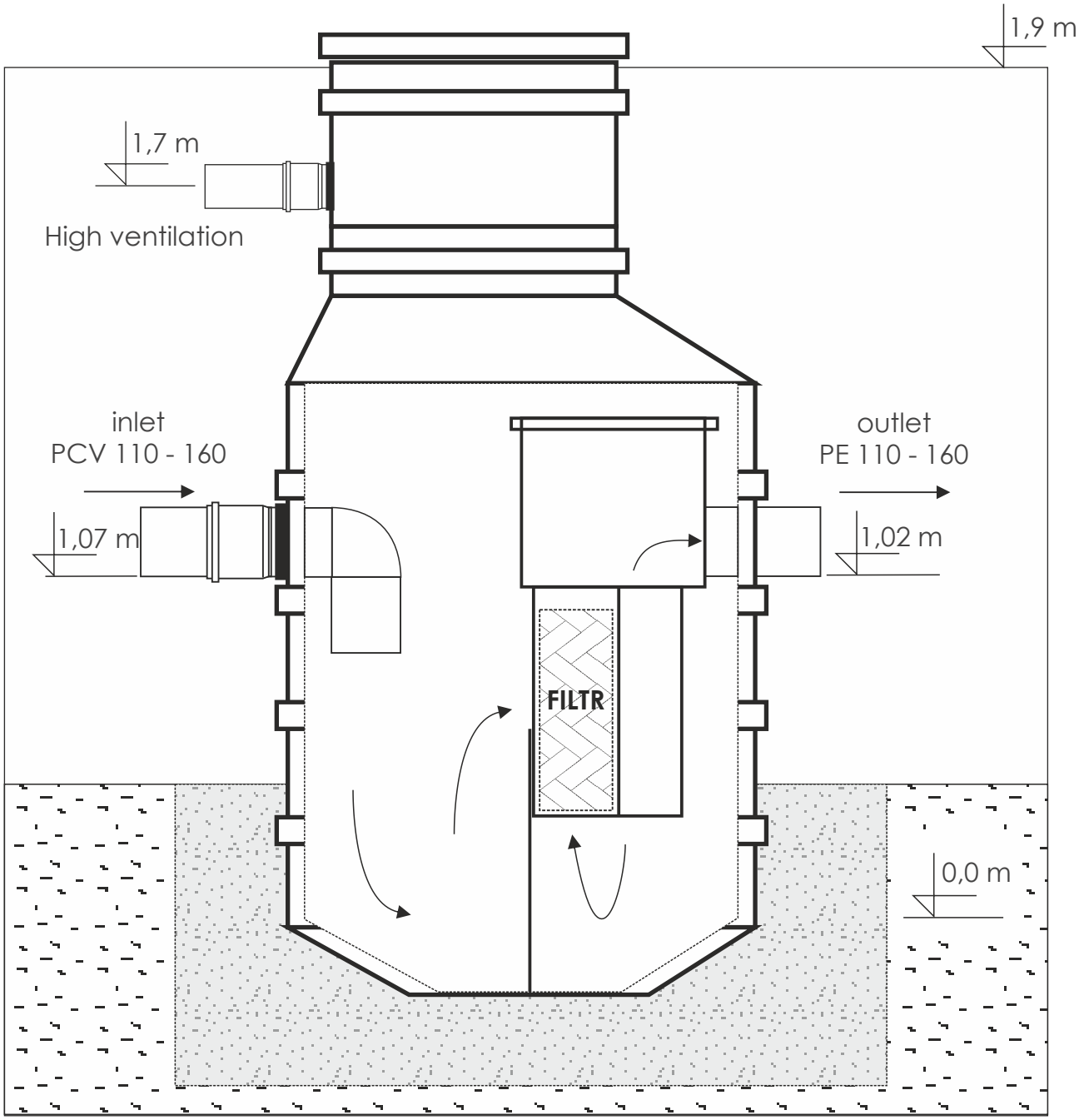
The series of separators offers two solutions

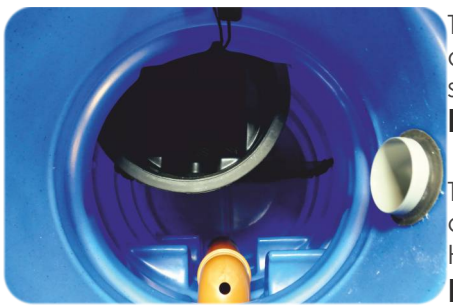
- BSK with a settling tank 100-200 times greater than the nominal flow
- TSK with a settling tank at least 300 times larger than the nominal flow

Separator type	Number of units or positions in the carwash	Amount of sediment
TSK-3	2	medium
TSK-4	3	medium
BSK-6	5	medium
TSK-6	5	high
BSK-8	7	medium
TSK-8	7	high
BSK-10	9	medium
TSK-10	auto.carwash	high

Sweparator to accept entire flow ???	Separator version with strom bypass	catchmnt area covered with paving
		m²
TSK-1P	TSK-3B	110
TSK-3	TSK-3B	230
TSK-4	TSK-3B	300
BSK-6, TSK-6	TSK-3B	460
BSK-10, TSK-10	TSK-3B	770
BSK-15, TSK-15	TSK-3B	1150
BSK-20, TSK-20	BSK-6B, TSK-6B	1530
BSK-25, TSK-25	BSK-6B, TSK-6B	1920
BSK-30, TSK-30	BSK-6B, TSK-6B	2300
BSK-35, TSK-35	BSK-8B, TSK-8B	2690
BSK-40, TSK-40	BSK-8B, TSK-8B	3070
BSK-45, TSK-45	BSK-10B, TSK-10B	3460
BSK-50, TSK-50	BSK-10B, TSK-10B	3840
BSK-60, TSK-60	BSK-15B, TSK-15B	4610
BSK-70, TSK-70	BSK-15B, TSK-15B	5380
BSK-80, TSK-80	BSK-20B, TSK-20B	6150
BSK-100, TSK-100	BSK-20B, TSK-20B	7690
BSK-120, TSK-120	BSK-30B, TSK-30B	9200
BSK-140, TSK-140	BSK-30B, TSK-30B	10760

9.1 - Single-wall Coalescing separators



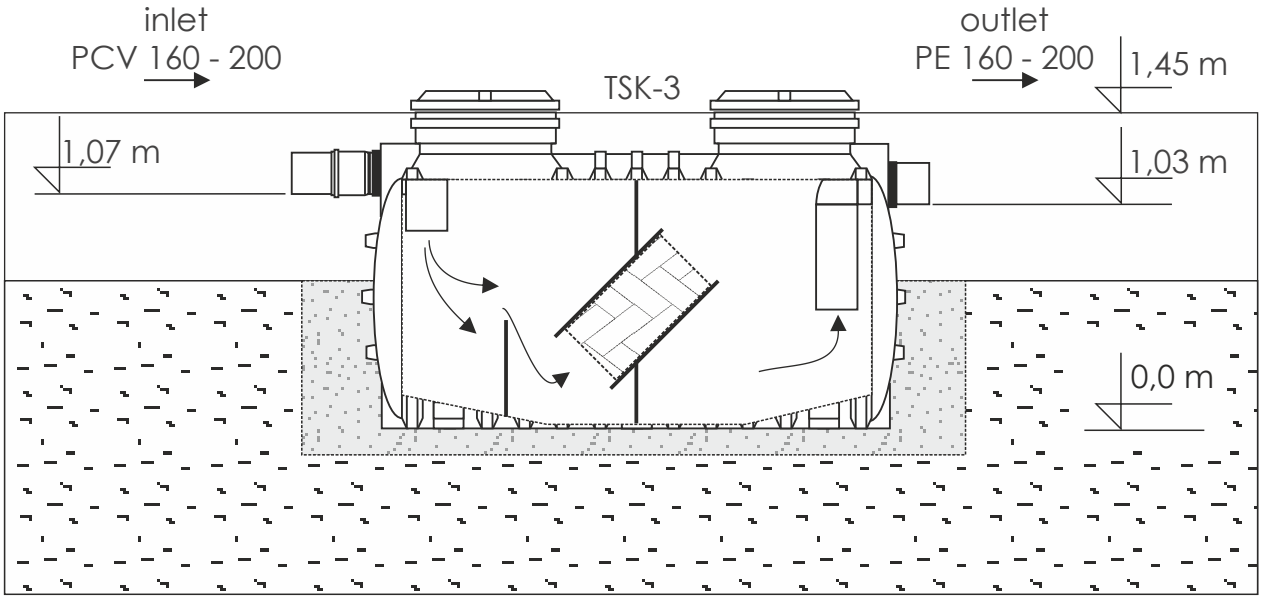


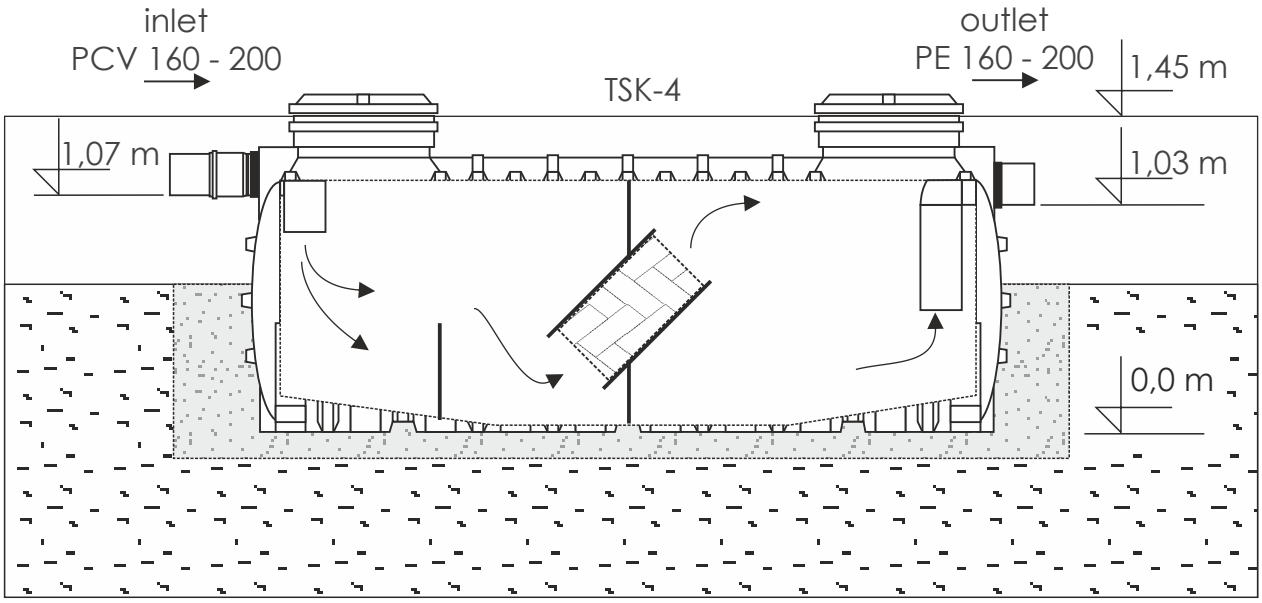
The product has the following declarations of compliance with the standard:
PN-EN 858-1:2005/A1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

Separator Type	Nominal Flow	tank Capacity	Diameter	Height	Construction
	l/s	m^3	m	m	
TSK-1P	1,5	0,6	1,0	1,4	Single-wall

9.1 - Single-wall Coalescing separators





The product has the following declarations of compliance with the standard:
PN-EN 858-1:2005/A1:2007

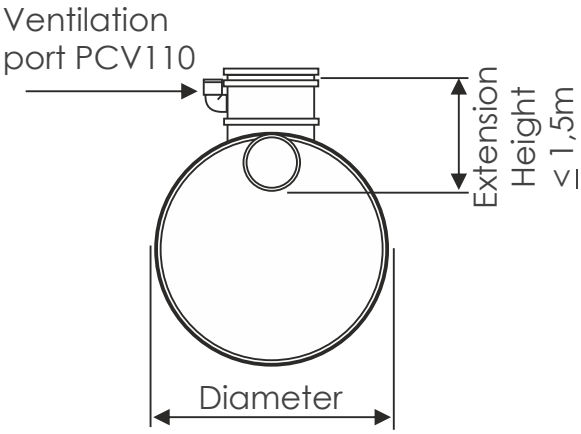
The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018

Separator Type	Nominal Flow	Tank Capacity	Lenght	Width/ Height	Construction
	l/s	m³	m	m	
TSK-3	3	0,9	2,2	1,2/1,2	Single-wall
TSK-4	4	1,2	3,3	1,2/1,2	Single-wall
TSK-6	6	2,0	3,5	1,2/1,6	Single-wall

9.1 - Double-wall Coalescing separators

Coalescence separators, integrated with sedimentation tank, depending on the type, have 2 or 3 inspection hatches.

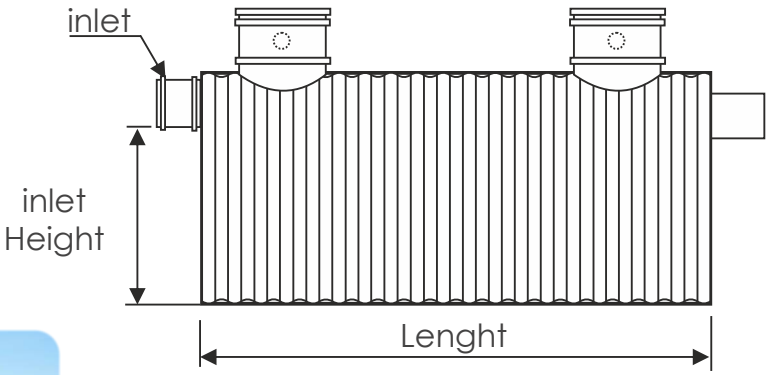
And they can be equiped with self-closing drain(optional).



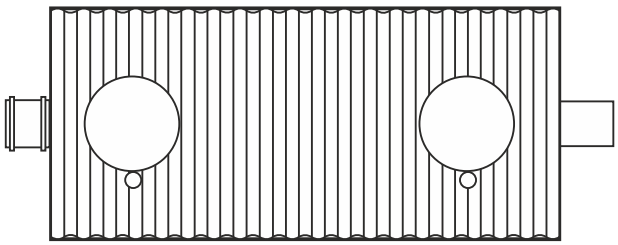
View on shorter tank side

The product has the following declarations of compliance with the standard:
PN-EN 858-1:2005/A1:2007

The product has the following certificates:
Hygenic Certificate :
BK/W/0338/01/2018



View on longet tank side


Top view

Separator Type	Nominal Flow	Tank Capacity	Vol. of Oil gathered	Lenght	Diameter	Diameter of In/out flow	Height of inlet form bottom	Number of manholes	Konstrukcja
	l/s	m^3	m^3	m	m				
TSK-3	3	0,9	0,20	2,0	1,2	160	1.04	2	Double-wall
TSK-4	4	1,2	0,27	2,9	1,2	160-200	1,00	2	Double-wall
BSK-6	6	1,2	0,27	2,9	1,2	160-200	1,00	2	Double-wall
TSK-6	6	2,5	0,55	4,6	1,2	160-200	1,00	2	Double-wall
BSK-10	10	2	0,28	3,1	1,5	160-200	1,26	2	Double-wall
TSK-10	10	3	0,42	4,3	1,5	160-200	1,26	2	Double-wall
BSK-15	15	3	0,42	4,3	1,5	200-250	1,23	2	Double-wall
BSK-15	15	3	0,42	4,8	1,5	200-315	1,15	2	Double-wall
BSK-20	20	4	0,56	6,0	1,5	200-250	1,23	2	Double-wall
BSK-25	25	3	0,42	4,8	1,5	200-250	1,23	2	Double-wall
BSK-30	30	3	0,42	5,4	1,5	200-250	1,23	2	Double-wall
BSK-30	30	5	0,70	6,5	1,5	200-315	1,15	3	Double-wall
BSK-40	40	4	0,56	6,0	1,5	200-315	1,15	2	Double-wall
BSK-50	50	5	0,70	7,1	1,5	200-315	1,15	3	Double-wall

9.2 - Double-wall Coalescing separators with BY-PASS

Coalescence separators are devices designed for installation before dischargwe into rainwater drainage system water that may contain petroleum pollutants.

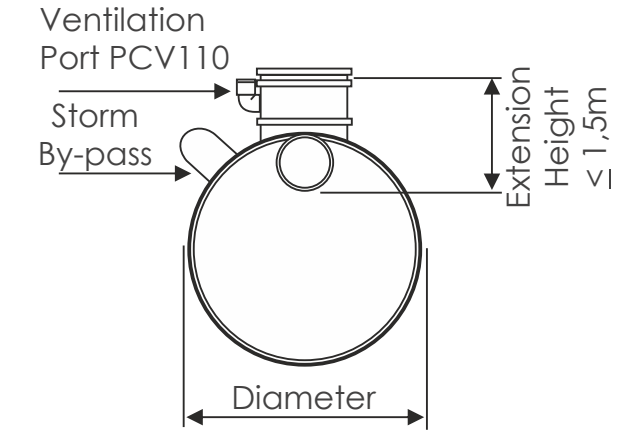
In a situation where the catchment area may be characterized by high flow variability(e.g. parking and vehicle traffic), a solution involving a storm BY-PASS are used

Separators are normally equiped with a settlin tank(sand trap), a filter with a coalescing cartrige and a storm bypass, which starts in settling tank chamber, and the end is connected to separator outlet.

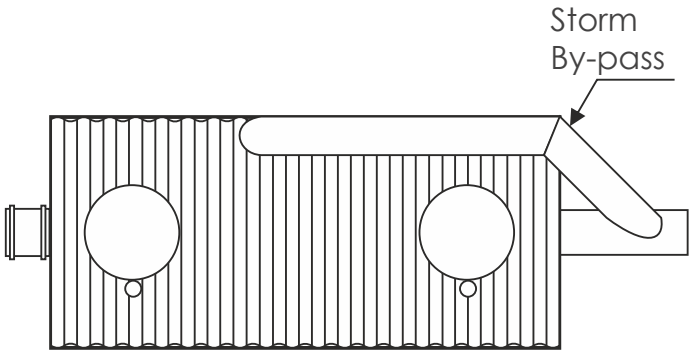
The flow value is described by two parameters

- Nominal
- Maximum (With storm BY-PASS system)

In a situation where a deeper instalation of the separator is required, it is recommended to increase the diameter of standard inspection hatches from 60cm to 80cm. This facilitates maitence operations



View on shorter tank side



Top View

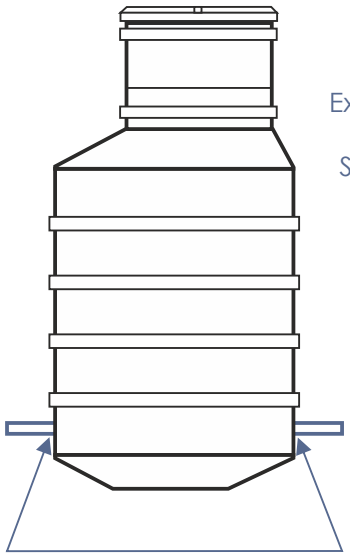
The product has the following declarations of compliance with the standard:
PN-EN 858-1:2005/A1:2007

The product has the following certificates:
Hygenic Certificate : **BK/W/0338/01/2018**

Separator Type	Nominal Flow	Max. Flow	Tank Capacity	Vol. of Oil gathered	Lenght	Diameter	Diameter of In/out flow	Height of inlet form bottom	Number of manholes
	l/s	l/s	m³	m³	m	m			
TKS-3B	3	15	0,9	0,20	2,0	1,2	160-200	1.00	2
BSK-6B	6	30	1,2	0,27	2,9	1,2	160-200	1,00	2
BSK-6B2	6	60	1,2	0,27	2,9	1,2	160-200	1,00	2
TSK-6B2	6	60	2,5	0,55	4,6	1,2	160-200	1,00	2
BSK-10B	10	50	2,0	0,28	3,1	1,5	200-250	1,23	2
BSK-10B2	10	100	2,0	0,28	3,7	1,5	250-315	1,15	2
TSk-10B2	10	100	4,0	0,56	5,4	1,5	250-315	1,15	2
BSK-15B	15	75	3,0	0,42	4,3	1,5	250-315	1,15	2
BSK-15B2	15	150	3,5	0,49	6,0	1,5	250-315	1,15	2
TSK-15B2	15	150	5,0	0,70	6,5	1,5	250-315	1,15	3
BSK-20B	20	100	4,0	0,56	5,4	1,5	250-315	1,15	2
BSK-20B2	20	200	4,0	0,56	6,0	1,5	250-315	1,15	2
BSK-30B	30	150	3,5	0,49	6,0	1,5	250-315	1,15	2
BSK-30B2	30	300	6,0	0,84	7,7	1,5	250-400	1,05	3
BSK-40B	40	200	4,0	0,56	7,1	1,5	250-400	1,05	2
BSK-40B2	40	400	4,0	0,56	7,1	1,5	315-400	1,05	2
BSK-50B	50	250	5,0	0,70	7,1	1,5	315-400	1,05	3
BSK-50B2	50	500	5,0	0,70	7,7	1,5	315-400	1,05	3

10.0 - Water meter wells

Designed for installation in any terrain regardles of ground and water conditions. The construction of the tank ensures tightness and protects devices installed inside. Access to the interior of the tank is provided through an inspection hatch with a diameter of approx 60cm. In order to fasten the well in case of surfacing a concrete layer is made (in bottom part). Made in accordance with the instructions provided, it enables the well to be secured against the buoyancy force. Flanges (instaled inside the manhole) are offered as additional equipment
When ordering them, please specify the exact distance to insert the appropriate accessories.
The offered connections range from PE32 to PE110. At the customer's request, more than two connections can be made, depending on the type of the manhole.



Example
Well
SW 100

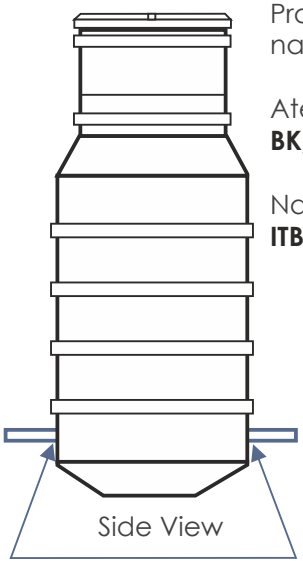
Pe pipes welded to the body
(without gaskets)

Type	Tank Diameter	Diameter of extension	Diameter of manhole	Height	Inlet /Outlet	Construction
	m	m	m	m	mm	
SW80/1,8 HDPE R	0,8	0,6	0,6	1,8	32-40	single-wall
SW100/1,9 HDPE R	1,0	0,6	0,6	1,9	32-50	single-wall
SW120/1,8 HDPE R	1,2	0,6	0,6	1,8	32-75	single-wall

Type	Tank Diameter	Diameter of extension	Diameter of manhole	Height	Inlet /Outlet	Construction
	m	m	m	m	mm	
SW 120 HDPE Z	1,2	1,2	0,6	1,5 - 2,5	32-75	Double-wall
SW 150 HDPE Z	1,5	1,5	0,6	1,5 - 2,5	32-90	Double-wall
SW 200 HDPE Z	2,0	2,0	0,6	1,5 - 2,5	32-110	Double-wall
SW 250 HDPE Z	2,5	2,5	0,6	1,5 - 2,5	32-160	Double-wall

10.1 - Single-wall Water meter wells

Water meter well SW80



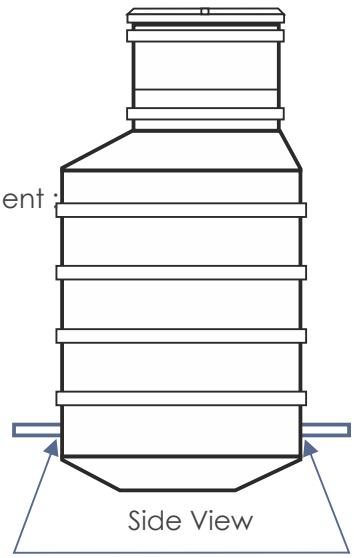
Pe pipes welded to the body
(without gaskets)

Produkt posiada
następujące certyfikaty:

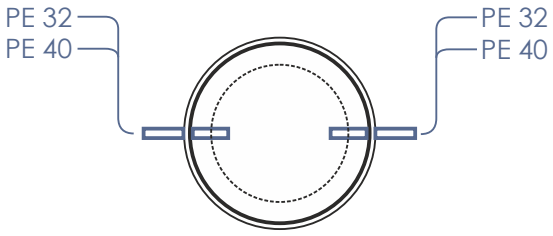
Atest Higieniczny:
BK/W/0338/03/2018

National Technical Assessment :
ITB-KOT-2018/0401

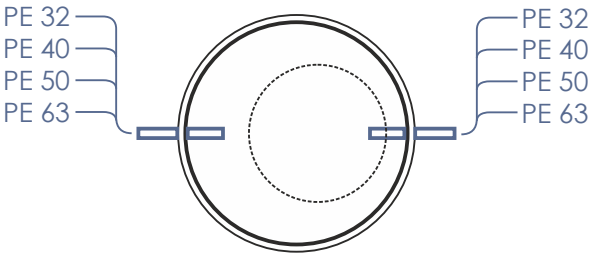
Water meter well SW100



Pe pipes welded to the body
(without gaskets)



Top View



Top View

Type	Chamber Diameter	Extension Diameter	Manhole Diameter	Height	Connection Diameter	Construction
	m	m	m	m	mm	
SW80/1,8 HDPE R	0,8	0,6	0,6	1,8	32-40	Single-wall
SW100/1,9 HDPE R	1,0	0,6	0,6	1,9	32-63	Single-wall

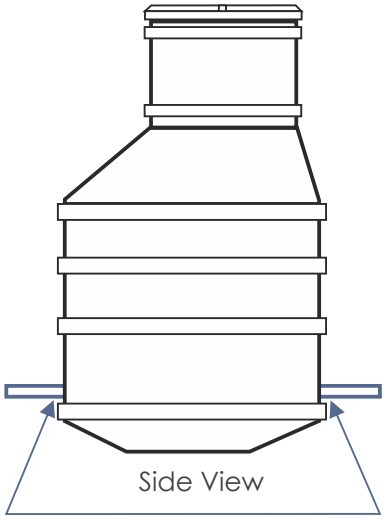
10.1 - Water meter wells

Studzienka wodomierzowa SW120

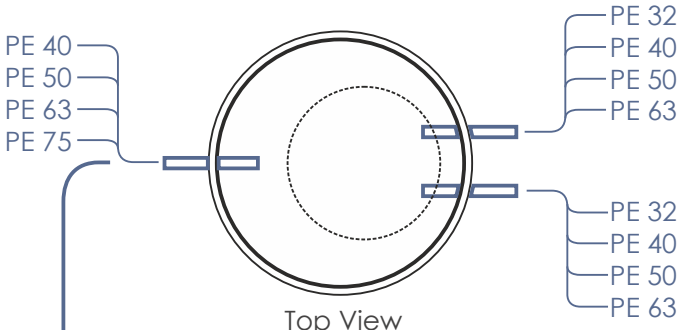
The product has the following certificates:

Hygenic Certificate: **BK/W/0338/03/2018**

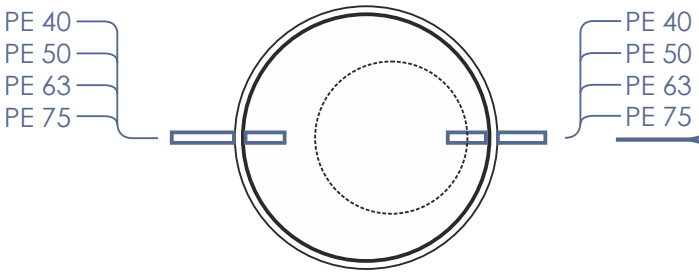
Krajowa Ocena Techniczna: **ITB-KOT-2018/0401**



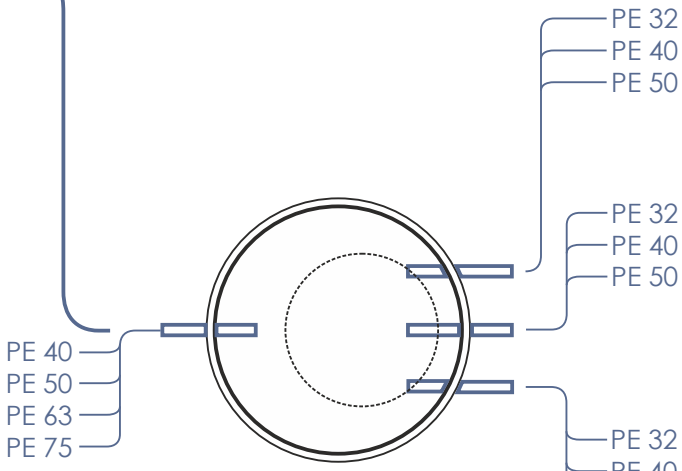
Pe pipes welded to the body
(without gaskets)



Top View
non-standard version
(3 przyłącza)



Top View
standard version
(2 connections)



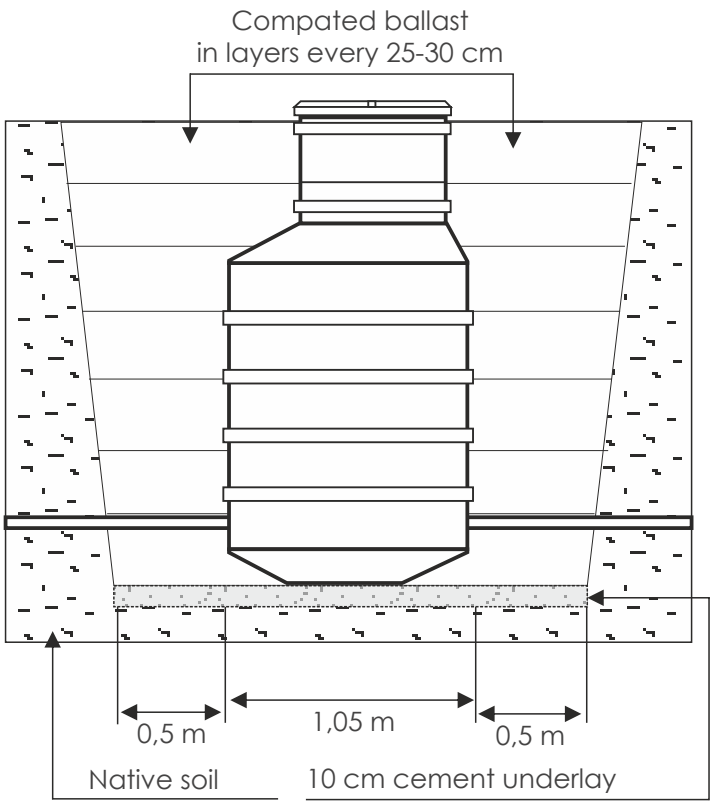
Top View
non-standard version
(4 connections)

Typ	Tank Diameter	Extension Diameter	Manhole Diameter	Height	Connections Diameter	Construction
	m	m	m	m	mm	
SW120/1,8 HDPE R	1,2	0,6	0,6	1,8	32-75	Single-wall

Placing well in sandy soils without the possibility of occurence of ground water.

Prior to installation, check if the tank is not damaged. Make the excavation so that there is a free space of 50cm between the pit and thew walls of the excavation (for purpose of covering and compacting with sand). well shoud be placed on 10 cm cement-gravel underlay. Then it shoud be leveled and lightly covered with sand in order to stabilize and connect the water pipes.

The well shoud be covered with layers 25 cm thick. Each layer shoud be compacted. When two or more tanks are instaled, remember that the distance between them cannot be less than 1m.



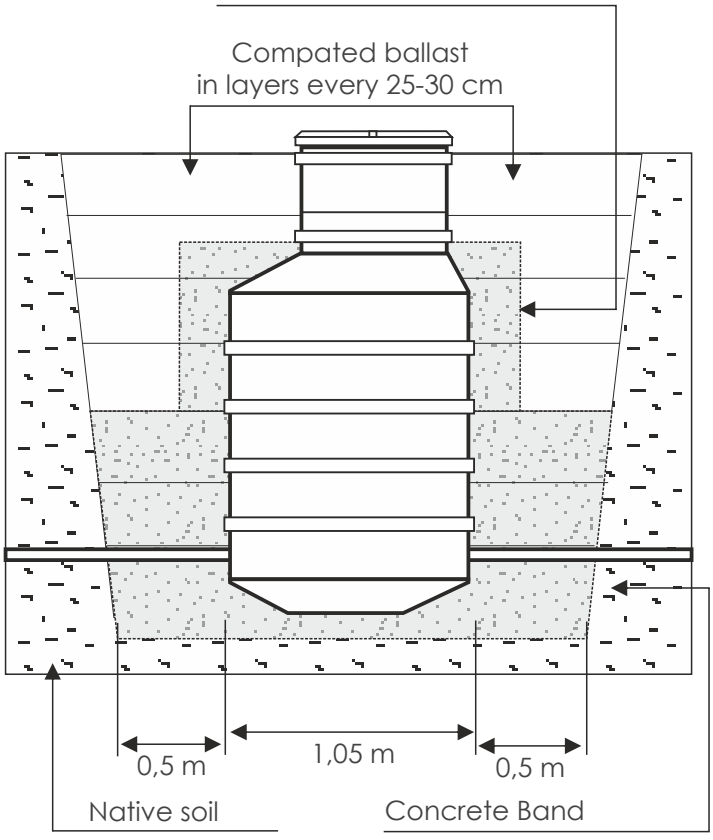
Placing well in sandy, clayey soils with the possibility of occurence of ground water.

If there is groundwater, a cement-gravel band should be made in the place where the tank is located. After making the excavation, a mixtuer of cement "350" and gravel of fraction 1-3mm should ba prepared, in ratio of 1:5.
Pour the prepared mixture onto the trench bed to thicknes of around 10cm. Then place the well onto the underlay, level it and connect water pipes. pour rest of the mixture around the well(50cm) to a height of 100cm (halfway up)

In case of very high levels of water increase the amount of backfill in such a way that its upper surface is above the water level. The resulting cement-gravel band should be compacted and covered with sand layers 25cm thick. Subsequent layers of sand shouldo be compacted.

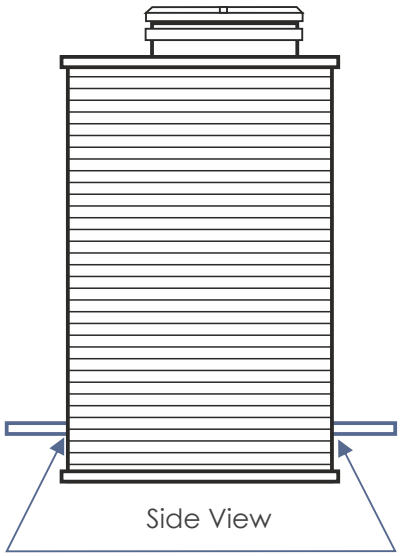
Groundwater should be lowered below the bottom of the trench during instalation.

In the case of clay and clayey soils, additional conncrete layer shoud be used.



10.2 - Double-wall Water meter wells

Water meter well SW 120 / SW 150 / SW 200

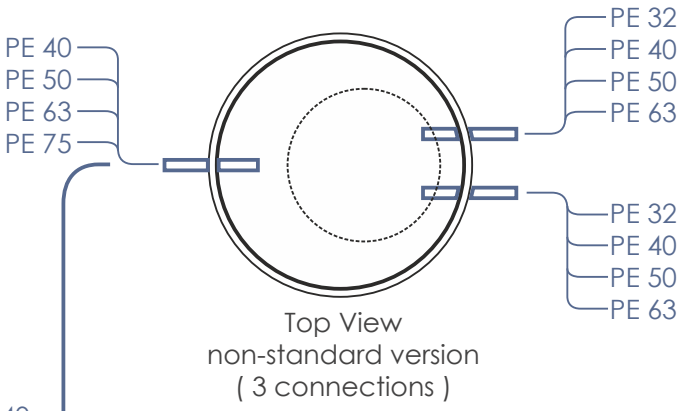


Pe pipes welded to the body
(without gaskets)

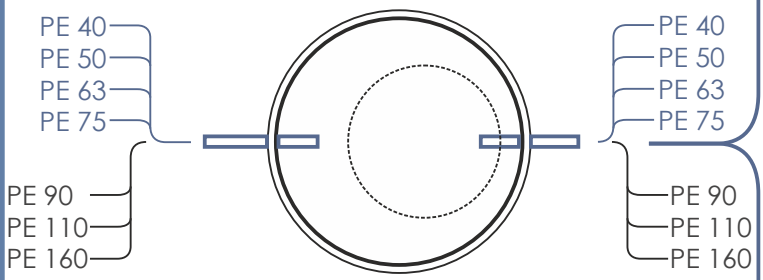
Product has the following certificates :

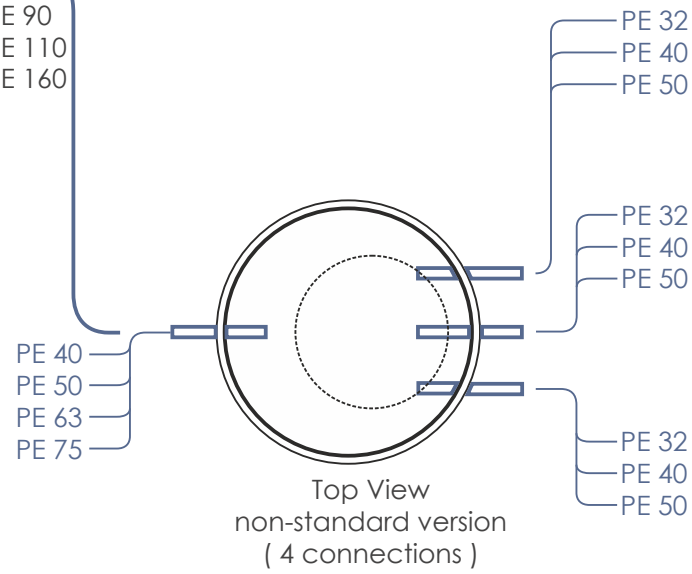
Hygenic Certificate: **BK/W/0338/03/2018**

National Technical Assessment: **ITB-KOT-2018/0401**



Top View
non-standard version
(3 connections)





Top View
non-standard version
(4 connections)

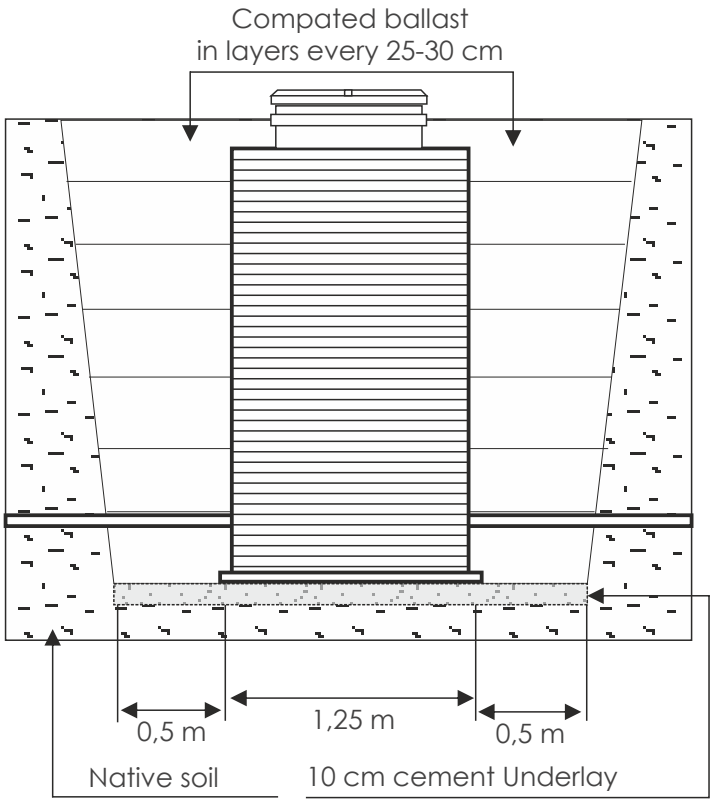
Type	Chamber Diameter	Extension Diameter	Manhole Diameter	Height	inlet /outlet	Construction
	m	m	m	m	mm	
SW 120 HDPE Z	1,2	1,2	0,6	1,5 - 2,5	40-75	Double-wall
SW 150 HDPE Z	1,5	1,5	0,6	1,5 - 2,5	63-90	Double-wall
SW 200 HDPE Z	2,0	2,0	0,6	1,5 - 2,5	63-110	Double-wall
SW 250 HDPE Z	2,5	2,5	0,6	1,5 - 2,5	63-110	Double-wall

10.2 - Double-wall Water meter wells

Placing well in sandy soils without the possibility of occurence of ground water.

Prior to installation, check if the tank is not damaged. Make the excavation so that there is a free space of 50cm between the pit and thew walls of the excavation (for purpose of covering and compacting with sand). well shoud be placed on 10 cm cement-gravel underlay. Then it shoud be leveled and lightly covered with sand in order to stabilize and connect the water pipes.

The well shoud be covered with layers 25 cm thick. Each layer shoud be compacted. When two or more tanks are instaled, remember that the distance between them cannot be less than 1m.

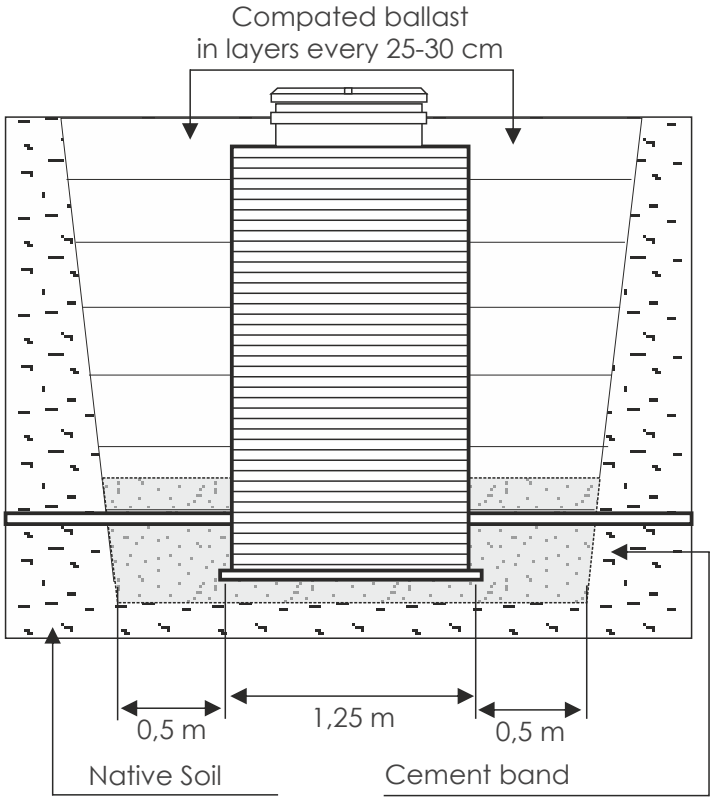


Posadowienie studzienki w gruntach piaszczystych i gliniastych z możliwością występowania wód gruntowych

If there is groundwater, a cement-gravel band should be made in the place where the tank is located. After making the excavation, a mixtuer of cement "350" and gravel of fraction 1-3mm should ba prepared, in ratio of 1:5.
Pour the prepared mixture onto the trench bed to thicknes of around 10cm. Then place the well onto the underlay, level it and connect water pipes. pour rest of the mixture around the well(50cm) to a height of 100cm (halfway up)

In case of very high levels of water increase the amount of backfill in such a way that its upper surface is above the water level. The resulting cement-gravel band should be compacted and covered with sand layers 25cm thick. Subsequent layers of sand shouldo be compacted.

Groundwater should be lowered below the bottom of the trench during instalation.



11.1 - Double-wall drainless tanks

Drainless tanks (tight septic tank), are made out of polyethylene (HDPE) with double-wall structure. They are intended to accumulate social and welfare sewage, rain water, fire fighting measures, etc.

The standard height of revisory manhole extension is about 60cm (measured from bottom of the inlet pipe). it is possible to increase it through connecting extensions. At the customer's request, it is possible to manufacture an revisory manhole extension of the required height.

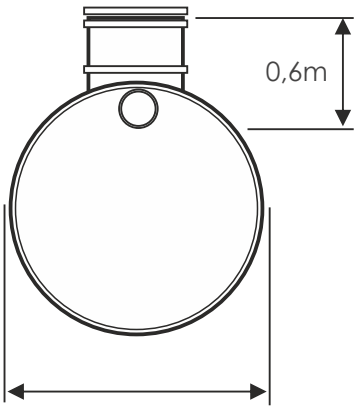
The range of tanks offered includes capacity from 2m³ to 75m³. The folowing table shows examples of the capacity of the tanks depending on their diameter.

For selected volumes, it is possible to manufacture tank with difrent diameter.

The product has the following certificates:

Hygenic seal of approvall:
BK/W/0338/02/2018

National technical assessment:
ITB-KOT-2019/0888



View of the shorter side of the tank

Capacity	Tank diameter (m).				Construction
m³	1,2 m	1,5 m	2,0 m	2,5 m	
2	2,0				Double-wall
3	2,9	2,0*			Double-wall
4	3,8	2,6*			Double-wall
5	4,7	3,1*			Double-wall
6	5,6*	3,7			Double-wall
7	6,5*	4,2			Double-wall
8		4,8			Double-wall
9		5,4			Double-wall
10		6,0	3,6		Double-wall
12		7,1	4,2		Double-wall
14		8,2*	4,9		Double-wall
16			5,5		Double-wall
18			6,1		Double-wall
20			6,8		Double-wall
25			8,4		Double-wall
30			10,0*	6,6	Double-wall
35			11,5*	7,6	Double-wall
40			13,1*	8,7	Double-wall
45				9,7	Double-wall
50				10,7	Double-wall
55				11,7*	Double-wall
60				12,7*	Double-wall
65				13,8*	Double-wall
70				14,8*	Double-wall
75				15,8*	

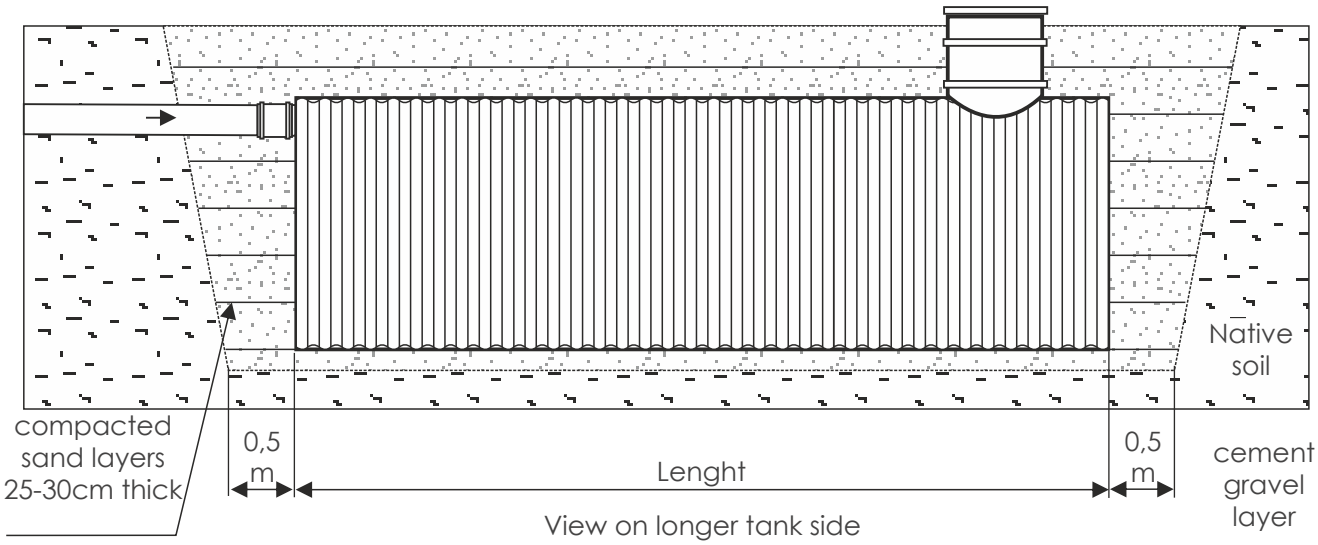
The table shows the dimensions of standard and non-standard tanks (marked with "*")

Placing the tank in sandy soil without the possibility of groundwaters.

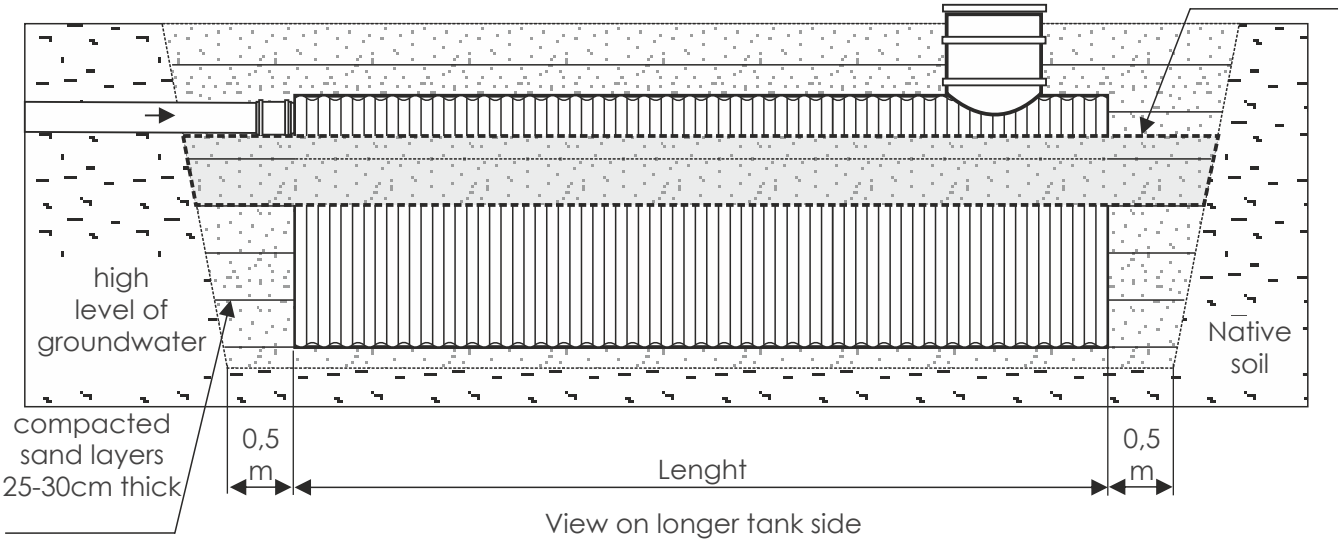
Make the trench so that there is a free space of 0.5m between the tank and thew walls of the excavation (for the purpose of covering and compacting with sand). Tank shoud be placed on a 10cm sand bed. Then leveled and lightly covered with sand to stabilize it. The tank shoud be filled with water in such a way that the level of water is higer than the than the level of backfill. The tank shoud be covered with layers 25cm thick. then layer shoud be compacted. Where two or more tanks are installed, the distance between them must not be less than 1m.

Placing the tank in sand, clayey and argillaceous areas with high level of groundwater (or in the case of their periodical occurence, e.g. in spring, after hevy rainfall, etc.)

In the case of grounwater at the site of placing the tank, a cement-gravel layer shoud be made. First, prepare a mix of cement "350" with gravel of fraction 1-3mm, in ratio 1 : 5. tank shoud be placed on a 10cm sand bed, leveled and stabilized. Then covered with sand compacting it every 25cm, while keeping water inside above current layer. the Prepared cement-gravel mixture shoud be poured in 2/3 of the tank height, with atleast 30cm thick layer. Then apply sand compacting it every 25cm. If here is high level of groundwater, it shoud be lowered below the bottom of the trench during installation.



View on longer tank side

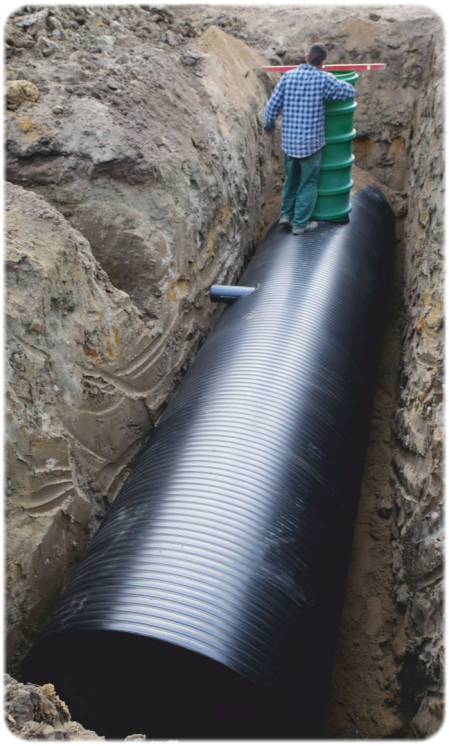


View on longer tank side

11.1 - Double-wall drainless tanks (Photographs)

Additional accessories of septic tanks, inslude:

- A suction port which allows emptying the tank from outside of the plot.
- Filling level signaling (box with sensor)



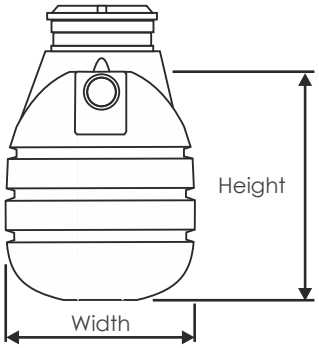
11.2 - Single-wall drainless tanks

Drainless tanks (tight septic tank), made out of polyethylene (HDPE) are also produced with single-wall structure. They are intended to accumulate sewage, rain water, etc.

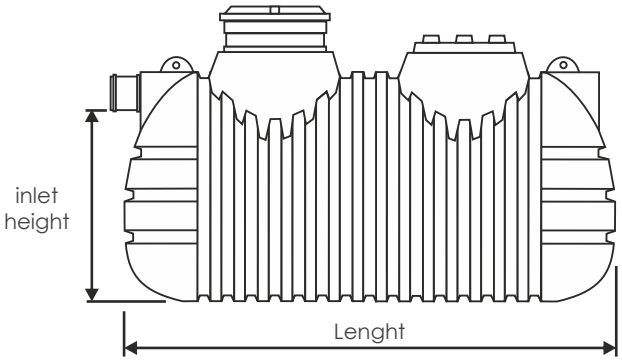
The standard height of revisory manhole extension is about 50cm (measured from bottom of the inlet pipe). it is possible to increase it through connecting extensions.

At the customer's request, it is possible to manufacture an revisory manhole extension of the required height.

The range of offered tanks covers the capacity from **2 m³** to **5 m³**.



view on shorter tank side



view on longer tank side

The product s the following certificates:

Hygenic seal of approvall: **BK/W/0338/02/2018**

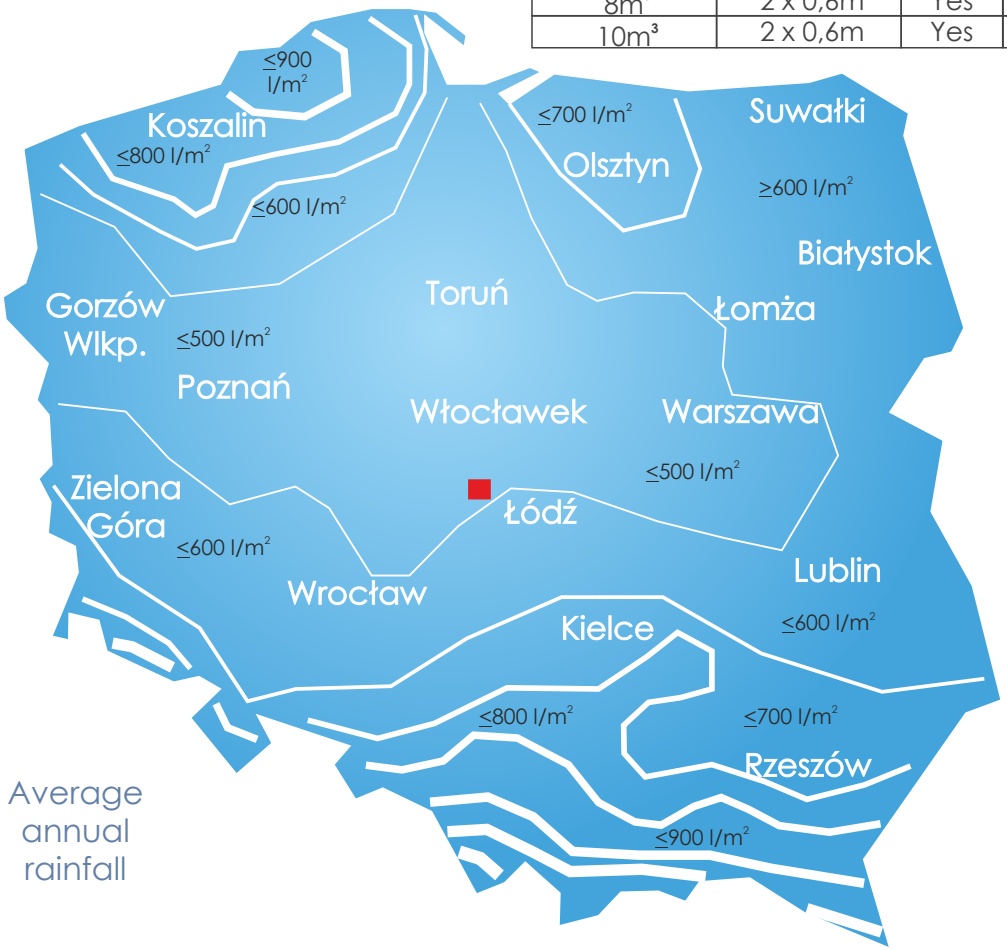
National technical assessment: **ITB-KOT-2019/0888**

Total capacity	inlet diameter	height of inlet	Height	Lenght	manhole diameter
m³	mm	m	m	m	m
2	110-160	1,16	1,4	2,0	0,6
3,5	110-160	1,16	1,4	3,2	0,6
5	110-160	1,36	1,6	3,5	0,6

11.3 - Rainwater tanks

The managment of rainwater is a wat to make certain savings. The possibility of using rainwate on plot (e.g. for watering or filing the sewage treatm ent palnt after periodic sludge disposal, etc.) depends largely on the amount of rainfall and the frequewncy of its occurence in given region.
Depending on your needs, we offer rainwater tanks with capacity between 2m³ to 75m³ and diameter from 1,2m to 2,5m
As a standard, there is additional filter at the inlet and overflow (in order to drain excess to drainage packages or abso well). Optionall the tank can be equiped with a pump.

Tank Capacity	amount and diamete of manhole	inlet filter	Optional EBARA pump
2m³	2 x 0,6m	Yes	OPTIMA MA
3m³	2 x 0,6m	Yes	OPTIMA MA
4m³	2 x 0,6m	Yes	OPTIMA MA
5m³	2 x 0,6m	Yes	OPTIMA MA
6m³	2 x 0,6m	Yes	BEST 2 MA
7m³	2 x 0,6m	Yes	BEST 2 MA
8m³	2 x 0,6m	Yes	BEST 2 MA
10m³	2 x 0,6m	Yes	BEST 3 MA



Average annual rainfall

12.0 - Biological sewage treatment plants - ZBB double-wall

Hybrid sewage treatment plants combine advantages of several technologies in order to obtain a better final effect.

The MBBR (Moving Bed Biofilm Reactor) technology is based on use of plastic carriers with large surface area (so-called fluidized bed), which enable the cration and growth of biofilm (mass of microorganisms).

Compared to the typical active sludge technology, such solution has the the following advantages:

Greater stability of work.

lower sludge production.

less susceptibility to changes in raw sewage parameters.

The ZBB sewage treatment plants have a double-wall structure (Body, Partitions, Bottoms). This significantly increases the strenght and stability of the tank construction.
The high strenght of this configuration enables installation even in difficult terain conditions and at a greater depth than single-wall products. This advantage makes it possible to connect a house sewer with a gravity slope to the seawge treatment plant, even when it is deeply recessed.

Many yeras of experience of our company in the field of Bio. treatment plants and production of double-walled tanks intended fo instalation in ground, contributed to creation of the ZBB series in such a durable and compact form.

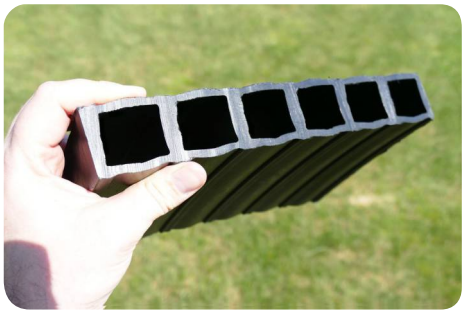
In treatment plant with a fluidized bed, exist a continous movment of carriers by the air supplied with membrand diffuser(during oxygneation).

The wastewater treatment plants has safeguards between chambers, designed to keep the fluidized bed(cariers) in one chamber. In addition, it is posible to empty said chamber(Slurry tanker) without loss of cariers.

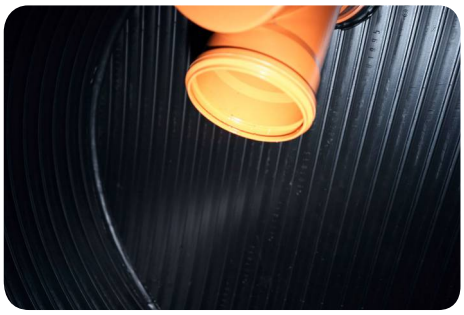
12.0 - Biological sewage treatment plants - ZBB double-wall

Design and technological solutions of the ZBB sewage treatment plant result in creation of series, the advantages of which are presented below:

- Use of a fluidized bed with large specific surface > 500m²/m³,
- Large total capactity (ok. 4,5m³ dla np. 7 PE),
- 3-chamber system,
- High strenght thanks to the double-wall body structure (Photo A), partition walls and endcaps which additionally strengthen the structure (Photo B),
- Possibility of installation in difficult conditions with a constant or periodically high groundwater level,
- Possibility of installation at a greater depth, enabling gravity drainage of sewage (when the exit from the building is led deeper),
- Extensive automatic control with an information display (Photo C)
- Possibility of installing a GSM module,
- Block of automatically controlled solenoid valves with quick coupler socket (no manualy controled valves) (Photo D),
- Ability to chose several operating modes to improve effeciency and reduce costs,
- Automatic recirculation of sludge from the secondary to the primary sedimentation tank,
- Energy-saving SECOH blower,JDK-S type with protection and membrane damege alarm,
- Possibility of emptying the fluidized bed chamber without losing cariers,
- Good maitence accessibility through three inspection hatches with a diameter of 60cm (one for each chamber),
- Very good maitence accessibility through three inspection hatches with a diameter of 80cm (one for each chamber),



A



B

C

D

DESCRIPTION OF MODES TO CHOOSE FROM THE CONTROL PANEL FOR E.G. ZBB-7C :

MODE
(Vacation)

MODE
(Avaerage)
for approx. 4 people

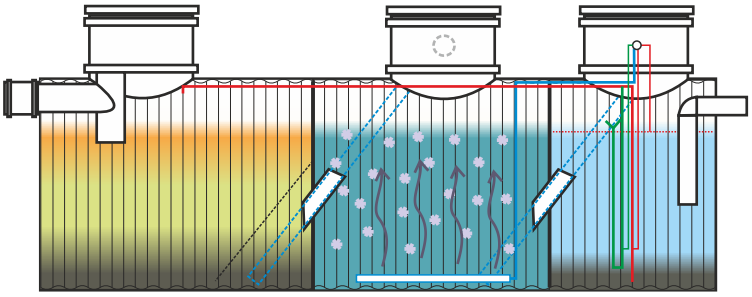
MODE
(Avaerage)
for approx. 5 people

MODE
(Full)
for approx. 7 people

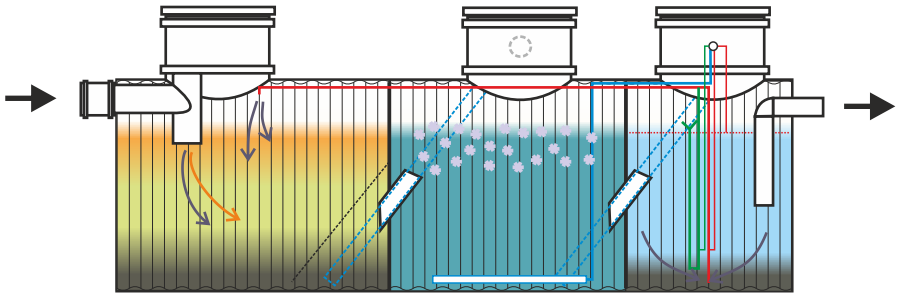
MODE
(short term increased performance)

The treament plant is conntroled automatically, equiped with modes enabling improvment of its operation and thus reducing energy costs. Blowers,sloenoid valves and pumps are controled automaticly acording to the current mode of operation.

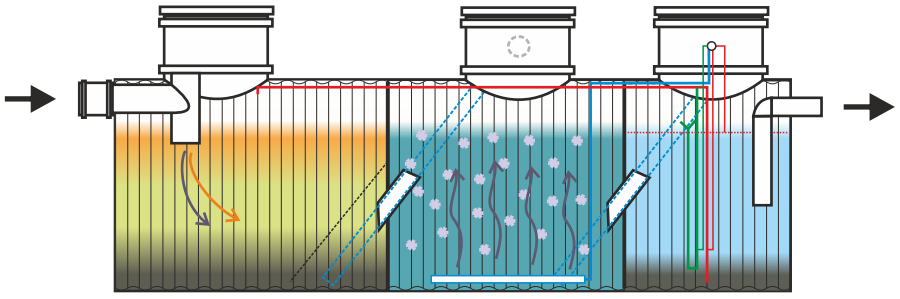
Operation of ZBB sewage treatment plant



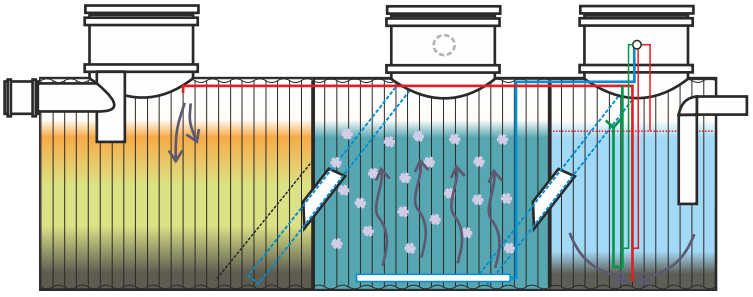
A) - Preparation of the treatment plant to receive the first wastewater during the day , by pre-oxygenation - activation of the biol chamber



B) - Periodic sludge recirculation with breaks in oxygenation



C) - Further wastewater inflow with continued oxygenation



D) - reduction of oxygenation with breaks for sludge recirculation (night period)

12.0 - Biological sewage treatment plants - ZBB double-wall

Purpose:
Social and household sewers.

Standard version operation technology:
hybrid (activ sludge with fluidized bed)

Construction of the standard version:
The tank is made fo high-density polyethylene, divided in three chambers:

- initial settling tank
- biological (oxygenation) chamber,
- secondary sedimentation chamber (with sludge recirculation)

Construction of the standard version:
Double-wall (increasing durability)

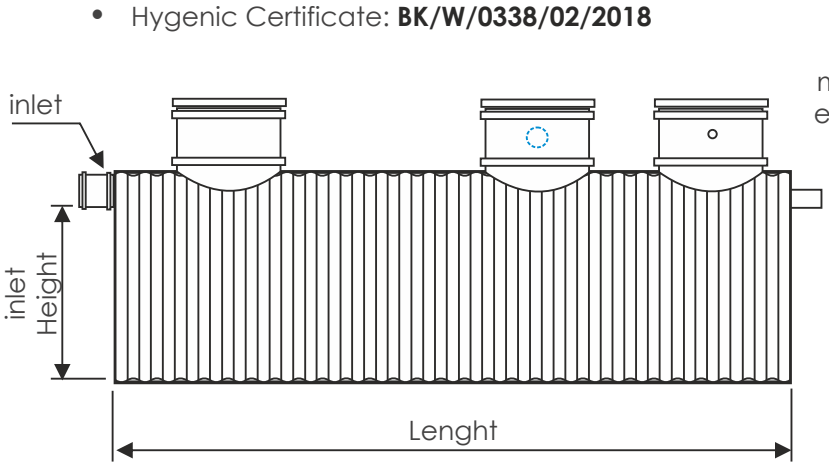
Standard version technical data:

- 1-phase power supply
- technical contai type PTM2
- automatic control with LCD
- PE 160 inlet,110 outlet
- 3 x 60cm inspection manholes (one for each chamber)
- height of the inspection manhole extension: 60cm (measured from bottom of the inlet pipe)

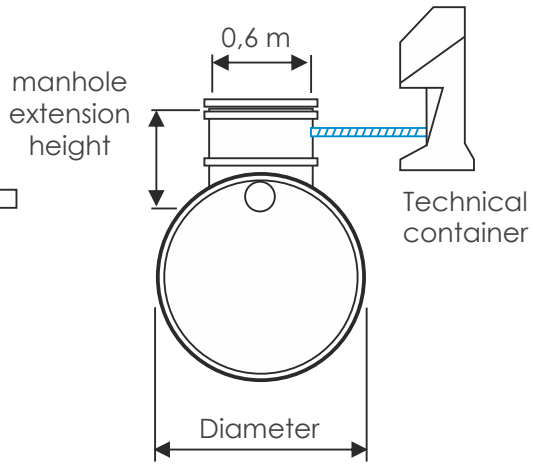
Certificates:

- Zgodność z normą: **PN-EN 12566-3+A2:2013**
- Hygenic Certificate: **BK/W/0338/02/2018**

Energy-saving blower, type JDK-S type with additional protection of membrane perforation (e.g. for ZBB-7C it is JDK-S-80)



View on longer tenk side



View on shorter tank side

Type	Number of users	Maximum dail throughput	BOD_{D5} load of raw sewage	Overall cap. of settling Tank	Tank Diameter	Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m.	m.	m^3
ZBB-7C	≤ 7	1,05	≤ 0,42	1,7	1,2	4,2	4,5
ZBB-10C	≤ 10	1,50	≤ 0,60	2,4	1,2	5,5	6,0
ZBB-12C	≤ 12	1,80	≤ 0,72	2,5	1,5	4,3	7,0
ZBB-16C	≤ 16	2,40	≤ 0,96	3,5	1,5	5,4	9,0

12.0 - Oczyszczalnie biologiczne - ZBB dwupłaszczowe

Purpose:
Social and household sewers.

Standard version operation technology:
hybrid (activ sludge with fluidized bed)

Construction of the standard version:
The tank is made fo high-density polyethylene, divided in three chambers:

- initial settling tank
- biological (oxygenation) chamber,
- secondary sedimentation chamber (with sludge recirculation)

Construction of the standard version:
Double-wall (increasing durability)

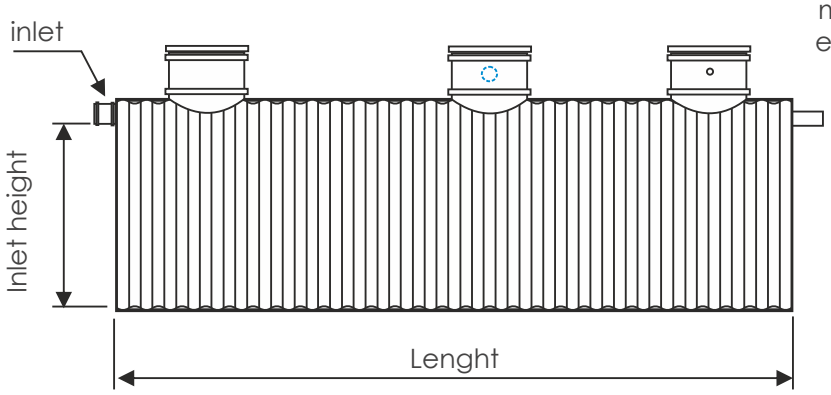
Standard version technical data:

- 1-phase power supply
- technical contai type PTD or PTR
- automatic control with LCD
- PE 160 inlet,110 outlet
- 2 x 60cm inspection manholes and 1 x 80cm (ZBB-20C) or 3 x 80cm (for from ZBB-30C to ZBB-50C)
- height of the inspection manhole extension: 70cm (measured from bottom of the inlet pipe)

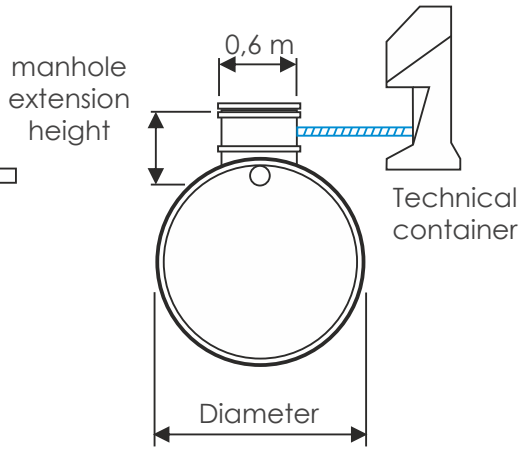
Certificates:

- Zgodność z normą: **PN-EN 12566-3+A2:2013**
- Hygenic Certificate: **BK/W/0338/02/2018**

Energy-saving blower, type JDK-S type with additional protection of membrane perforation



View on longer tank side



View on shorter tank side

Type	Number of users	Maximum dail throughput	BOD_{D5} load of raw sewage	Overall cap. of settling Tank	Tank Diameter	Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBB-20C	≤ 20	3,0	≤ 1,2	5,2	1,5	7,7	13,0
ZBB-30C	≤ 30	4,5	≤ 1,8	6,6	2,0	6,1	18,0
ZBB-40C	≤ 40	6,0	≤ 2,4	8,3	2,0	7,4	22,0
ZBB-50C	≤ 50	7,5	≤ 3,0	10,8	2,0	9,0	27,0

12.1 - Biological treatment plants -ZBS

For many yeras, low-loaded activated sludge has been used in biological wastewater treatment systems.

SBR technology (Sequenceing Batch Reactor)is a batch activated sludge method. It has folowing advantages over flow system:

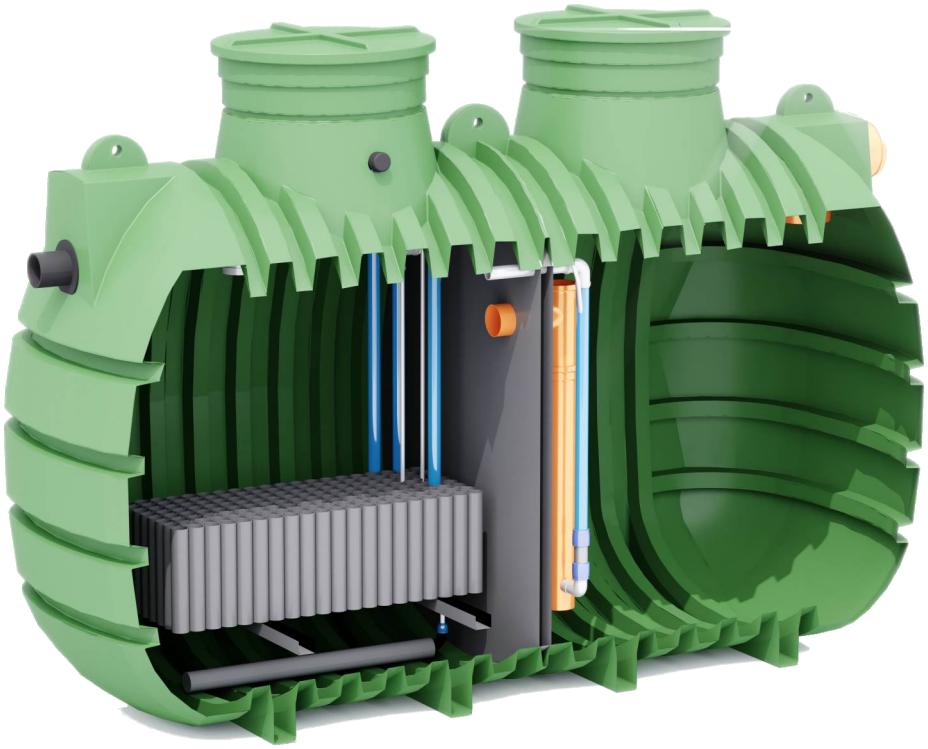
- Buffering the pollutant load
- Flow buffering

Flexibility of work

- work control

In a SBR treatment plant, the process is divided into cycles (carried out during the day). The number of cycles and their duration depends on the size of system and characteristics of their inflow.
Each of the cycles is divided into phases that allow proces to take place in the correct sequence. The key element of this solution is reliability of control system and equipment.

Many years of our experience in the field of biological treatment plants and control systems allowed us to develop and refine controls inside of technical container of the treatment plant.



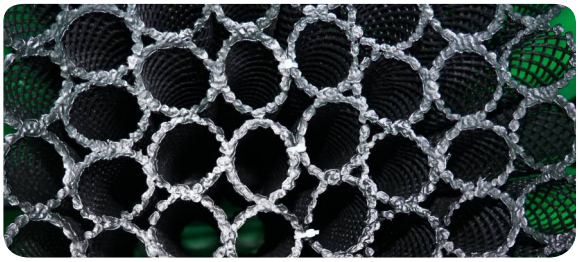
ZBS treat plant working in SBR technology. In described variant, is additionaly equiped with a biomas carrier in form of solid plastic packages (photo on the right).
Benefits of using additional carrier:

•increased work stability

•accelerated startup

•less possobility of losing generated activated-sludge

Design of tanks and their strength enable installation in various terain conditions and are intended to enable for gravity supply of house sewage to the sewage treatment plant.



12.1 - Biological treatment plants -ZBS

Optimization of constrution and technical equipment of the ZBS sewage treatment plant was aimed at combining various advantages and proven technical solutions. As a result, a rich in solution series was created, which can generally be divided into single and double wall models.

Advantages of single-wall solutions are presented below:

- Advanced SBR technology in full version, i.e. with automatically controlled:
  -Dosing
  -Sludge recirculation
  -Pumping
- Batch dosing and buffer retention prevent washing out sludge in case of short-term overload
- Compact desing and small dimensions facilitate location and assembly
- Application of an additional biomass carrier in process chamber
- Large total capacity(approx. 4m^3 for np. 6 PE),
- Increased durability, thanks to numerous ribbing in body construction and thick walls (Photo A) and double-walled partition(Photo B)
- Extensive automatic control with a display (photo C), and in version with pump(KP) as a PLC logic module (Photo D)
- Possibility of instaling a GSM module, enabling acc. to a request to send messages about a selected scope of information
- Possibility of adding achemical phosphorus precipitation system, i.e. dosing of PIX coagulant
- An extensive block of automatically controlled solenoid valves with quick coupler (no manualy controled valves, Poto E)
- Possibility to chose several operating modes to improve efficiency abd reduce costs
- Energy-saving SECOH blower, JDK-S with protection and membrane puncture alarm
- Good maitence accessibility through inpection manholes with diameter of 60cm
- Option to choose KP version equipped with an EBARA pump and outlet(e.g. to drainage embankment)


A

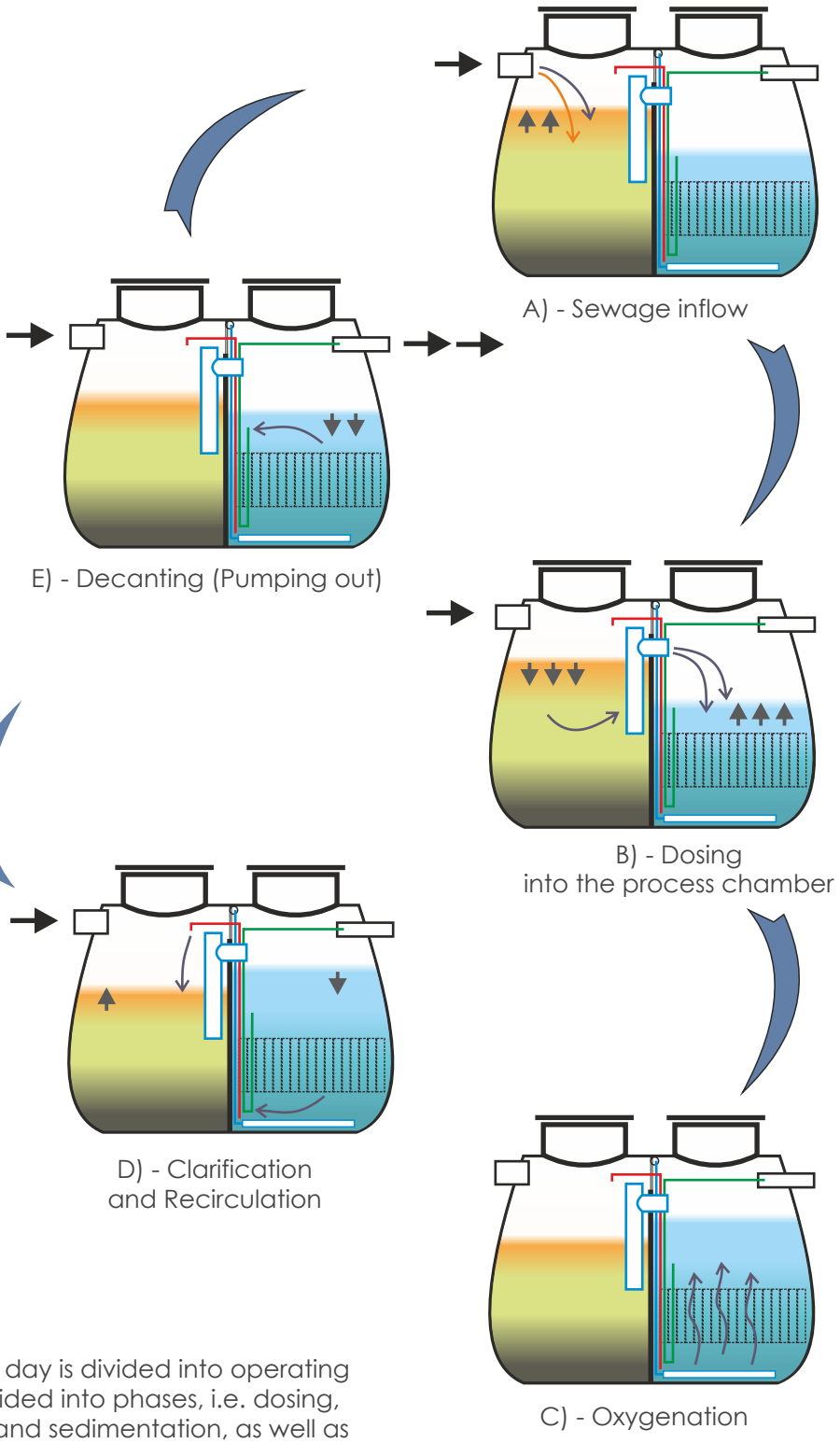

B

C

D


E

Several hour cycles are performed per day, and each of them is divided into phases ilustratd in following drawings



DESCRIPTION OF MODES TO CHOOSE FROM THE CONTROL PANEL FOR E.G. ZBB-6C :

MODE
(Vacation)

MODE
(Startup)

MODE
(Avaerage)
for approx. 3 people

MODE
(Full)
for approx. 6 people

MODE
(short term increased performance)

Treating process during the day is divided into operating cycles. Each of them is divided into phases, i.e. dosing, oxygenation, clarification, and sedimentation, as well as recirculation and decantation. This allows better flow control and increased efficiency.

12.1 - Biological treatment plant - ZBS

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

Construction of the standard version:
Th tank is made of high-density polyethylene (HDPE) divided in three chambers:

- Retention settling chamber
- A biological process chamber implementing subsequent SBR work cycles

Construction of the standatrd version:
Single-wall

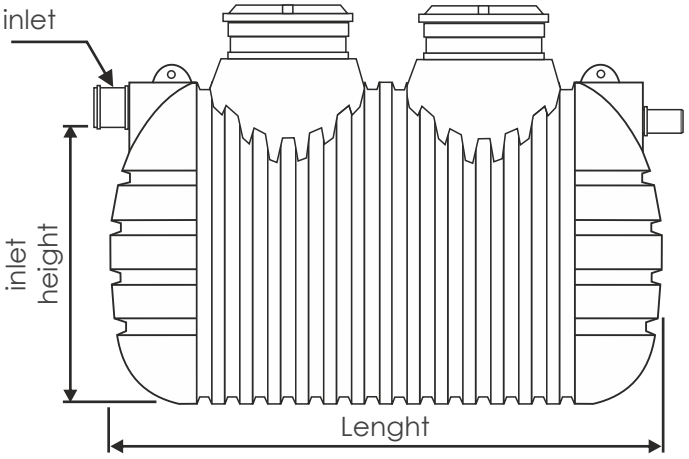
Standard version technical data:

- 1-phase power supply
- technical container type PTM2
- automatic controler with LCD
- PE 160 inlet, PE 110 outlet
- 2 x 60cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, 50cm (measured from bottom of the inlet pipe)

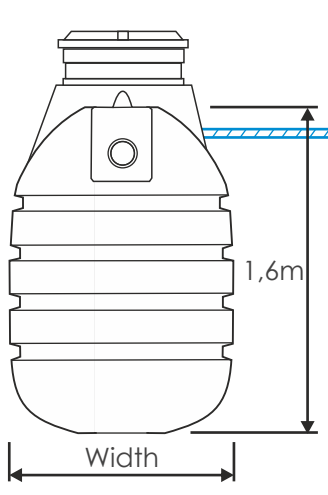
Energy-saving blower, type JDK-S-60 type with additional protection of membrane

Certificates:

- Compliance with standard: **PN-EN 12566-3+A2:2013**
- Hygenic certificate: **BK/W/0338/02/2018**



View on longer tank side



View on shorter tank side

Technical container

Additional equipment

- PIX coagulant dosing system

Type	Number of users	max. daily throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Width/ Height of tank	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-4C	≤ 4	0,6	≤ 0,24	1,2	1,2 / 1,6	1,8	2,5
ZBS-6C	≤ 6	0,9	≤ 0,36	2,0	1,2 / 1,6	2,8	4
ZBS-8C	≤ 8	1,2	≤ 0,48	2,5	1,2 / 1,6	3,5	5
ZBS-10C	≤ 10	1,5	≤ 0,60	2,5	1,2 / 1,6	3,5	5

12.2 - Biological treatment plants - ZBS with coagulant dosing

ZBS sewage treatment plant works in the SBR technology and in the described variant is equipped with a technical container extended with PIXcoagulant dosing system.

Benefits of using a wasterwater treatment plant with coagulant dosage:

- Increased job stability
- Possibility of installation in agglomeration
- reduction of phosphorus and nitrogen
- Fully automatic dosing process (separate pump) PLC logic module control
- Possibility of instaling a GSM module, enabling acc. to a request to send messages about a selected scope of information
- Placment of coagulant tank in an easily accessible place (in a technical container)

PIX coagulant is dosed automatically, which enables the precipitaion of phosphates (deposphation), which are used by bacteria as a source of energy in the oxygenation phase. PIX coagulant also supports the sedimentation process. During sedimentation, sediment falls to the bottom of tank. In this phase nitrogen removal(denitrification), also occurs. As a result sediment is separated from treated sewage which rises to surface.

Examples models are shown in table below.

TYPE of treatment plant w/ coagulant	Number of users	Cap.of coagulant tank	Number of coagulant pumps	GSM module	Additional equippment e.g. pump	Construction
	PE	L	pcs.			
ZBS-6C	≤ 6	25	1	Option	-	Single-wall
ZBS-6C/KP	≤ 6	25	1	Option	1 x EBARA	Single-wall
ZBS-8C	≤ 8	25	1	Option	-	Single-wall
ZBS-10C	≤ 10	25	1	Option	-	Single-wall

TYPE of treatment plant w/ coagulant	Number of users	Cap.of coagulant tank	Number of coagulant pumps	GSM Module	Additional equippment e.g. pump	Construction
	PE	L	szt.			
ZBS-5C	≤ 5	25	1	Option	-	Double-wall
ZBS-5C/KP	≤ 5	25	1	Option	1 x EBARA	Double-wall
ZBS-12C	≤ 12	25	1	Option	1 x EBARA	Double-wall
ZBS-20C	≤ 20	25	1	Option	2 x EBARA	Double-wall
ZBS-30C	≤ 30	50	1	Option	2 x EBARA	Double-wall
ZBS-40C	≤ 40	50	1	Standard	2 x EBARA	Double-wall

12.3 - Biological treatment plants - ZBS double-wall

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

Construction of the standard version:
Th tank is made of high-density polyethylene(HDPE) divided in three chambers:

- Retention settling chamber
- A biological process chamber implementing subsequent SBR work cycles

Construction of the standatrd version:
Single-wall

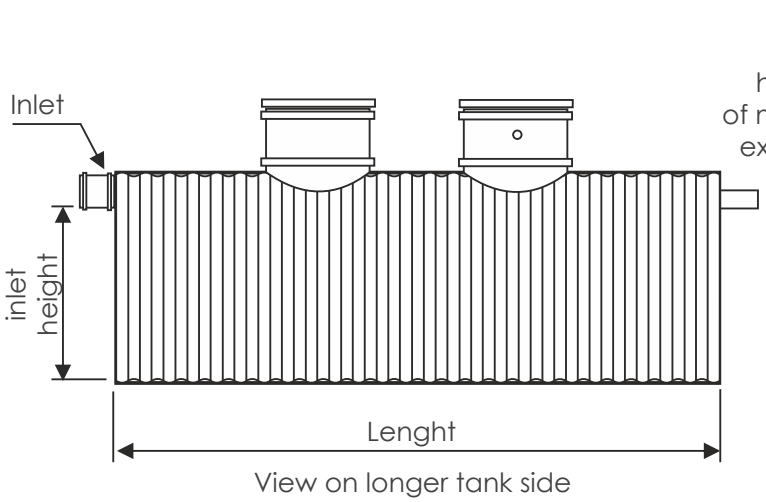
Standard version technical data:

- 1-phase power supply
- technical container type PTM2,
- automatic controler with LCD,
- PE 160 inlet, PE 110 outlet,
- 2 x 60cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, 50cm (measured from bottom of the inlet pipe)

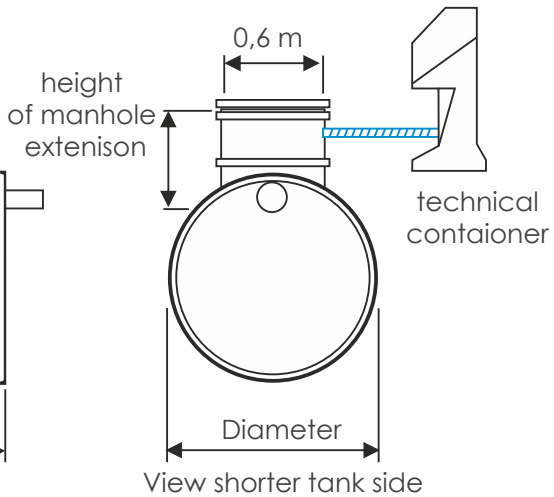
Energy-saving blower, type JDK-S-60 type with additional protection of membrane

Certificates:

- Compliance with standard: **PN-EN 12566-3+A2:2013**
- Hygenic certificate: **BK/W/0338/02/2018**



View on longer tank side



View shorter tank side

Additional equipment

- PIX coagulant dosing system

Type	Number of users	max. daily thouput	BOD_5 load of raw sewage	Cap. of retention chamber	Tank Diameter	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-5C	≤ 5	0,75	≤ 0,3	2,0	1,2	3,8	4,0

12.4 - Biological tereatment plants - ZBS-C/KP (with a pump)

Type with pump	Noumber of users	Construction
	PE	
ZBS-5C/KP	≤ 5	Double-wall
ZBS-6C/KP	≤ 6	Single-wall
ZBS-8C/KP	≤ 8	Single-wall
ZBS-10C/KP	≤ 10	Single-wall

SBR (Sequencing Batch Reactor) technology enables the construction of sewage plants equipped with pump at the outlet. It is a viable alternative to systemthat require a separate pumping station after the treatment plant.
An example may be chaneling to a drainage in an embankment or a deep level of drainage from building and the need to carry(pump) sewage to a higher level.

The solution described above was introduced to the market as ZBS-c /KP and the following advantages:

- Lower costs and building area than a system with a separate trated sewage pumping station
- Greater flexibility of applications due to lack of gravity outflow from sewage treatment plant to the receiver (drainage, absorption well etc.)
- Combination of controls of treatment plant and the pump, whitch enables extended level of control and information about the current operation (extended version)
- Increased degree of protection and reduction in pump wear

12.4 - Biological tereatment plants - ZBS-C/KP single-wall (with a pump)

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

Construction of the standard version:
Tank is made of high-density polyethylene(HDPE) divided in three chambers:

- Retention settling chamber
- A biological process chamber implementing subsequent SBR work cycles

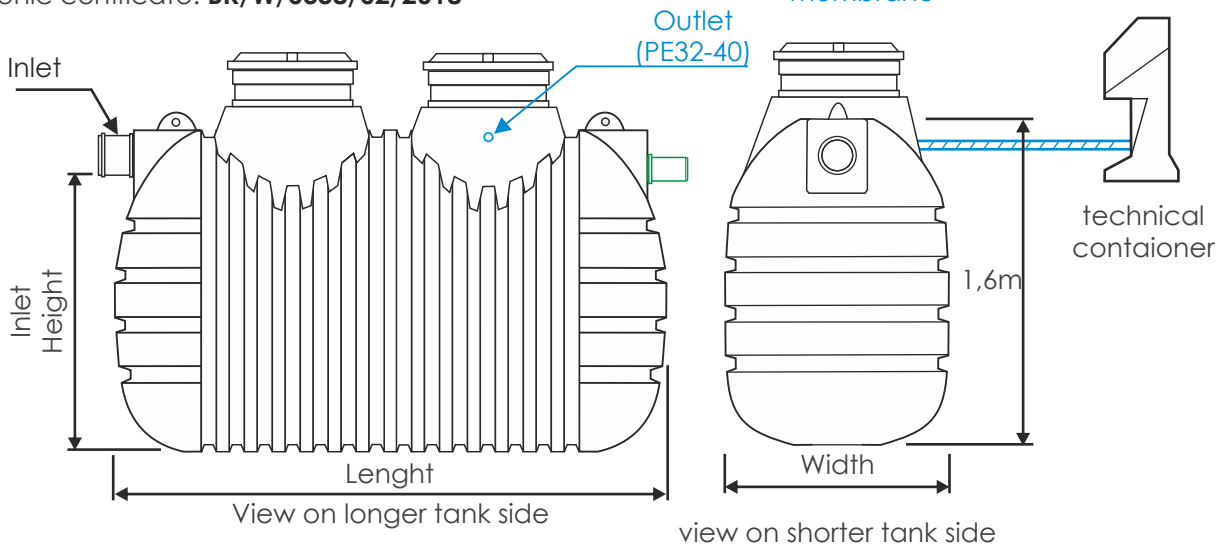
Construction of the standatrd version:
Single-wall

Standard version technical data:

- 1-phase power supply
- technical container type PTM2,
- automatic controler with LCD,
- EBARA OPTIMA MA -0,25KW pump on outlet
- PE 160 inlet, PE 32-40 outlet,
- 2 x 60cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, 50cm (measured from bottom of the inlet pipe)

Energy-saving blower, type JDK-S-60 type with additional protection of membrane

Certificates:
Compliance with standard: **PN-EN 12566-3+A2:2013**
Hygenic certificate: **BK/W/0338/02/2018**



Additional equipment

- PIX coagulant dosing system

Type	Number of users	Max. daily Throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Width/height of tank	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-6C/KP	≤ 6	0,9	≤ 0,36	2,0	1,2 / 1,6	2,8	4
ZBS-8C/KP	≤ 8	1,2	≤ 0,48	2,5	1,2 / 1,6	3,5	5
ZBS-10C/KP	≤ 10	1,5	≤ 0,60	2,5	1,2 / 1,6	3,5	5

12.5 - Biological tereatment plants - ZBS-C/KP single-wall (with a pump)

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

Construction of the standard version:
Tank is made of high-density polyethylene(HDPE) divided in three chambers:

- Retention settling chamber
- A biological process chamber implementing subsequent SBR work cycles

Construction of the standatrd version:
Single-wall

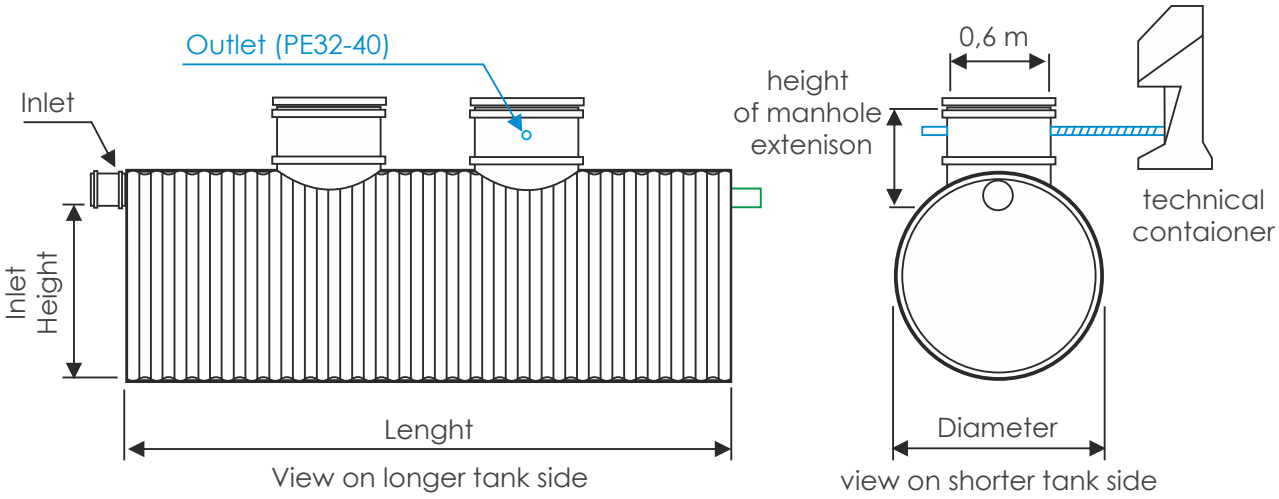
Standard version technical data:

- 1-phase power supply
- technical container type PTM2,
- automatic controler with LCD,
- EBARA OPTIMA MA -0,25KW pump on outlet
- PE 160 inlet, PE 32-40 outlet,
- 2 x 60cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, 50cm (measured from bottom of the inlet pipe)

Energy-saving blower, type JDK-S-60 type with additional protection of membrane

Certificates:

- Compliance with standard: **PN-EN 12566-3+A2:2013**
- Hygenic certificate: **BK/W/0338/02/2018**



Additional equipment

- PIX coagulant dosing system

Type	Number of users	Max. daily Throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Tank Diameter	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-5C/KP	≤ 5	0,75	≤ 0,3	2,0	1,2	3,8	4,0

12.6 - Biologil sewage treatment plants - ZBS-C/KP Ver.extended

ZBS-C/KP version (with pump) is also offred in an extended version.

The promiseof introduction of additional modification to the standard solutions was meant to extend the level of information and control over treatment plant as an integrated sustem.

Extended version includes:
- more extensive PLC control module with LCD diplay
- Extended work algorithm
- Additional blower controller
- Alarm lamp on lid of the tech. container to easily observe alarm codes or maitenance messages
- additional float switch in the treatment plant

As a result of the application of the above-mentioned additions and changes, the list of aditions of ZBS-C/KP can be extended with the following items:
- Shartened maitence time on treatment plant
- increased degre of protection of equipment
- further reduction of user involvment in the control of treatment plant

Extended version of the wastewater treatment plant can also be used more widely in developed objects or in case where user or maitenance person changes. The extemded controls and protection in such cases protect the system and facilitates conservation even with poor knowlege of maitence of the object.

Level of technical advancment of extended models is a dervative of systems intended for a larger number of users.

This allows the range of applications to be extended and aims-toward:
- Building constructed by developer
- single and multi-family buildings
- Public facilities
- schools, hotels, motels, guesthouses
- agrotourism

ZBS-C/KP Ver. standard

ZBS-C/KP ver. extended

12.7 - Biological treatment plants - ZBS double-wall

Treatment plants for 20 PE and more can be described in the form of a summary of advantages of technology, design and equipment:

- SBR technology(batch activated sludge)
- Additional biomass carrier in the process chamber
- double-wall construction (increased durability)
- Possibility of 1m below grund level (as standard)or deeper, i.e. in a version configured under special conditions and order
- Extended PLC control module with LCD display
- Automatic change of operating modes
- GSM module (SMS info) from ZBS-40C and bigger is standard (optional in smaller models)
- Dosing and pumping are carried out on EBARA pumps (from ZBS-40C auto-coupling), whitch allows better organization of the time of other operating phases(optional use of air jack on the above-mentioned phases)
- Four service hatches (from ZBS-30C 80cm diameter) whitch facilitate service and maitenance availabiity

Treatment plants are offered in two types:

- SInge-tank(compact) with a throuput of 150L/PE per day
- Two-tank with a flow of 200L/PE per day (greater t capacity of tanks and retention)

Table of single-tank(compact) sewage treatment plants with a double-wall structure

Type of treatment plant with pump	Number of users	Max. daily Throuput
	PE	m^3/d .
ZBS-20C	≤ 20	≤ 3,0
ZBS-30C	≤ 30	≤ 4,5
ZBS-40C	≤ 40	≤ 6,0
ZBS-50C	≤ 50	≤ 7,5
ZBS-100C	≤ 100	≤ 15,0
ZBS-130C	≤ 130	≤ 19,5
ZBS-150C	≤ 150	≤ 22,5
ZBS-200C	≤ 200	≤ 30,0

Table of single-tank(compact) sewage treatment plants with a double-wall structure

Type of treatment plant with pump	Number of users	Max. daily Throuput
	PE	m^3/d
ZBS-60R	≤ 60	≤ 12,0
ZBS-80R	≤ 80	≤ 16,0
ZBS-100R	≤ 100	≤ 20,0
ZBS-130R	≤ 130	≤ 26,0
ZBS-170R	≤ 170	≤ 34,0
ZBS-200R	≤ 200	≤ 40,0
ZBS-250R	≤ 250	≤ 50,0
ZBS-300R	≤ 300	≤ 60,0

In booth series, there is a genaral division int two chambers (settling and prosess chamber, i.e. SBR). It should be noted that sedimentation chamber, apart from the function of collectin pollutants and averagng their composition, also has a retention function. Efective flow buffering is possile thanks to the two-chamber structure of settling tank.

Scope of applications of the treatment plant includes:

- multi-family buildings
- Public facilities
- schools, hotels, motels, guesthouses
- restaurants, wedding halls
- Rest area

12.7 - Biological treatment plants - ZBS double-wall ≤ 50 PE

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

Construction of the standard version:
Tank is made of high-density polyethylene(HDPE) divided in three chambers:

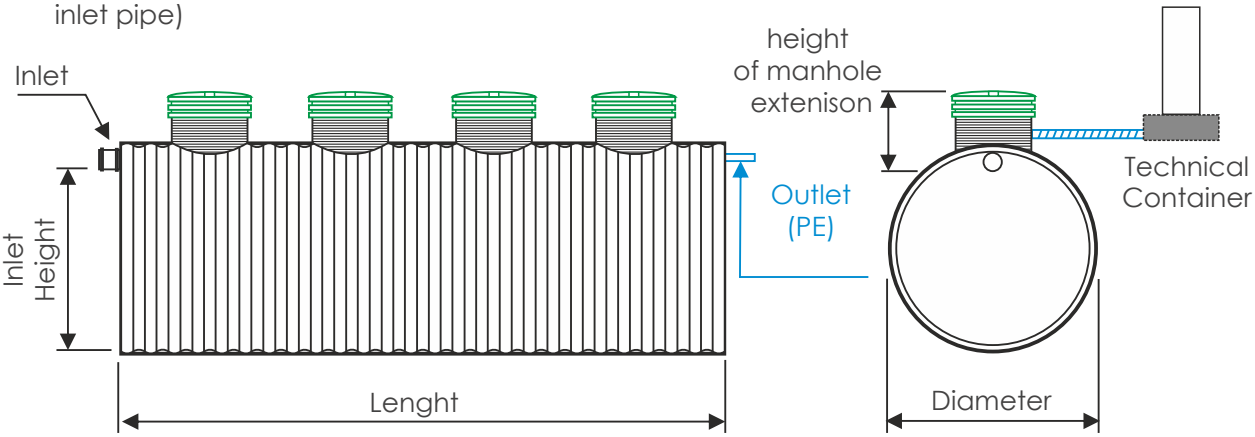
- Retention settling tank(2 chambers)
- A biological process chamber implementing subsequent SBR work cycles

Construction of the standatrd version:
Double-wall (increased)

Standard version technical data:

- 3-phase or 1-phase power supply(version dependant)
- Free-standing technical container
- automatic controler with LCD,
- GSM module (SMS info)in ZBS-40C and ZBS-50C
- EBARA pump on outlet (type depends on version)
- PE 160 inlet, PE 63 outlet,
- 2 x 80cm and 2x60cm or 4x80cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, min 70cm (measured from bottom of the inlet pipe)

Energy-saving blower, type JDK-S type with additional protection of membrane perforation



Additional equipment

- PIX coagulant dosing system

Certificates:

- Compliance with standard: **PN-EN 12566-3+A2:2013**
- Hygenic certificate: **BK/W/0338/02/2018**

Type	Number of users	Max. daily throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Tank Diameter	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-20C	≤ 20	3,0	≤ 1,2	6,0	1,5	7,1	12,0
ZBS-30C	≤ 30	4,5	≤ 1,8	9,5	2,0	6,5	19,0
ZBS-40C	≤ 40	6,0	≤ 2,4	12,0	2,0	8,1	24,0
ZBS-50C	≤ 50	7,5	≤ 3,0	13,8	2,0	9,0	27,0

12.7 - Biological treatment plants - ZBS double-wall > 50 PE

Purpose:
Social and household sewers.

Standard version operation technology:
SBR (Batch activated Sludge)

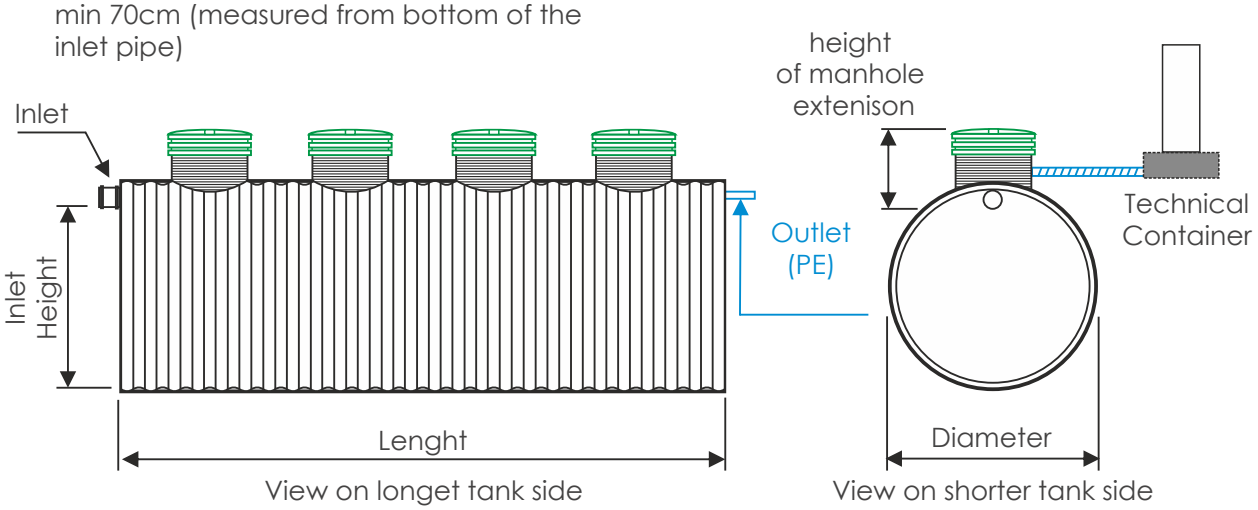
Construction of the standard version:
Tank is made of high-density polyethylene(HDPE) divided in three chambers:

- Retention settling tank(2 chambers)
- A biological process chamber implementing subsequent SBR work cycles

Construction of the standatrd version:
Double-wall (increased)

Standard version technical data:

- 3-phase or 1-sphase power supply(version dependant)
- Free-standing technical container
- automatic PLC controler with LCD,
- GSM module (SMS info)
- EBARA DW VOX outlet (outlet is a discharge port from the pump)
- PE 160 inlet, PE 63 outlet,
- 4x80cm inspection manholes (one for each chamber)
- height of the inspection manhole extension, min 70cm (measured from bottom of the inlet pipe)



Certificates:

- Compliance with standard: **PN-EN 12566-3+A2:2013**
- Hygenic certificate: **BK/W/0338/02/2018**

Additional equipment

- PIX coagulant dosing system

Type	Number of users	Max. daily throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Tank Diameter	Tank Lenght	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	m	m^3
ZBS-100C	≤100	15,0	≤ 4,80	18,0	2,5	7,8	36,0
ZBS-130C	≤130	19,5	≤ 7,80	21,0	2,5	9,3	43,0
ZBS-150C	≤150	22,5	≤ 9,00	25,0	2,5	11,1	52,0

12.8 - Biological treatment plants - ZBS double-wall (Photographs)

12.9 - Biological treatment plants - ZBS double-wall ≥ 60 PE

Purpose:
Social and household sewage

Operation technology:
SBR (Batch activated Sludge), in which the process of operation is divided into cycles. Each cycle is further divided into sequentially occurring phases, i.e.:

- Dosage
- Oxygenation
- Sedimentation and clarification
- recirbculation
- Pumping out

Advantages of the technology:
The lack of gravity flow through the sewage treatment plant improves the performance characteristics of the system and process stability. Buffering of the uneven inflow increases as well as reduces difference in the dosage load.

Control and communication:
It is implemented through PLC logic modues, responsible for the realization of the set program. In addition, there are several operating modes to chose from, increasing efficienty and facilitating maitence on the system. In standard configuration, system is equipped with a GSM communication module and (after connection to network), remote monitoring of the current status, maiteance and alarm codes. This shortens the response time to malfunctions and reminds of required maiteance.

Construction:
The treatment plant is realized with two double-wall tanks, made of high dnsity polyethylene(HDPE). Description of the tank purpose (along the sewage flow):

- Preliminary-retention sedimentation tank (periodically emptied of accumulated sediments)
- SBR reactor with an additional biomass carrier and an aeration system

Constructioion advantages:
The double-wall construction ensures a significat increase in the durability of tanks and increases the amount of thermal insulation. This applies to both the bodies and bottoms, or the revision hatch extensions. The use of additional biomas carrier in the form of plastic packages increases the degree of uork stability and accelerates the start-up of the system

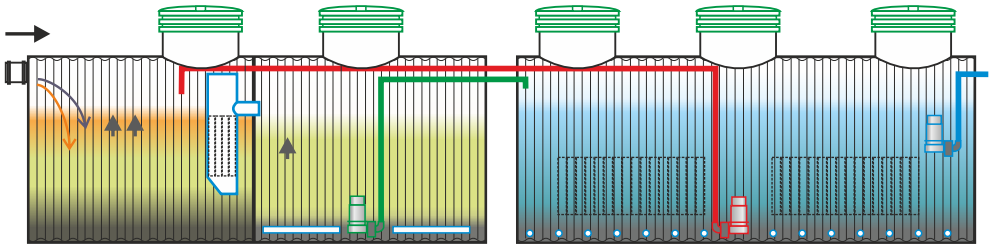
Equipment:
The sewage treatment plant is equipped with pipe diffusers (fine-bubble). Depending on the size of the system, the oxygenation system is powered by several membrane blowers or a side chanel blower.

The operating phases, i.e. dosing, pumpng or sludge recirculation, are caried ouy mechanical pumps mounted on coupling feet. this shortens the realization time of the above-mentioned cycles, thus extending the time of the remaining phases, especially oxygenation.

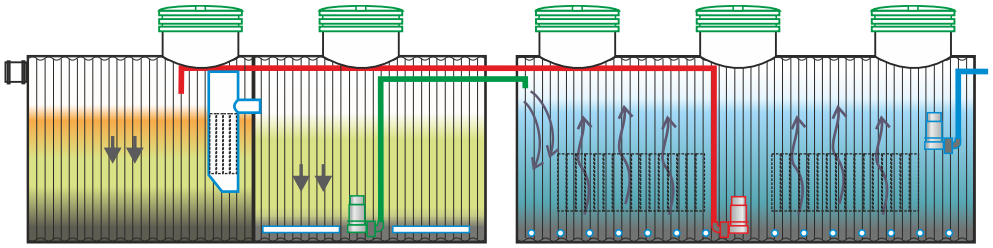
Additional equipment:
- PIX coagulant dosing system
- Inspection hatches extension with diameter of 80cm

Type	Number of users	Max. daily throuput	BOD_5 load of raw sewage	Cap. of retention chamber	Tank Diameter	Amount / Lenght of tanks	Total Capacity
	PE	m^3/d	kg O_2/d	m^3	m	szt. x m	m^3
ZBS-60R	≤60	12,0	≤ 3,60	16,0	2,0	2 x 5,5	32,0
ZBS-80R	≤80	16,0	≤ 4,80	22,0	2,0	2 x 7,4	44,0
ZBS-100R	≤100	20,0	≤ 6,00	27,0	2,0	2 x 9,0	54,0

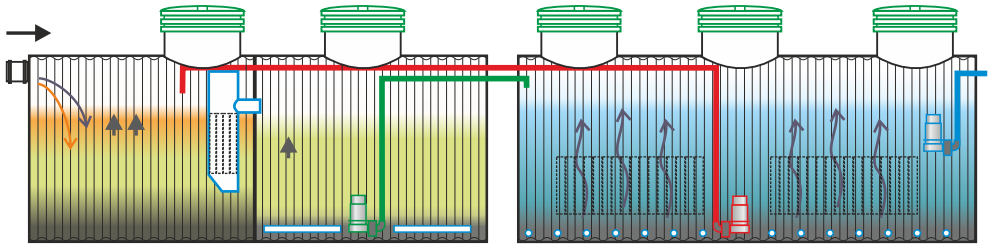
Several-hour cycles of work are arried out within 24 hours and each of them is divided into phases illustrated in the figures below



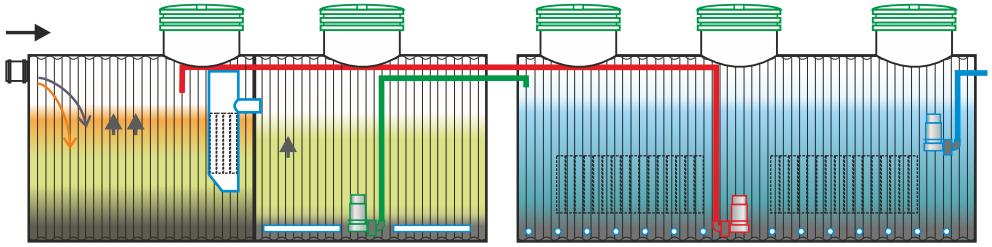
A) - Sewage inflow



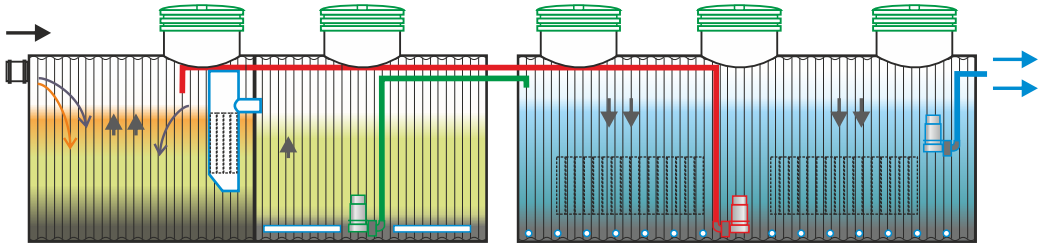
B) - Dosing into the process chamber (Cycle start)



C) - Oxygenation



D) - Sedimentation and clarification



E) - Sludge recirculation and decantation (pumping out)

13.0 - Sets of biological treastment plants (On rinsed gravel)

Table for selecting the lenght of drainage on rinsed gravel (in the ground) to the number of users (flow) and type of bio. tratment plant.

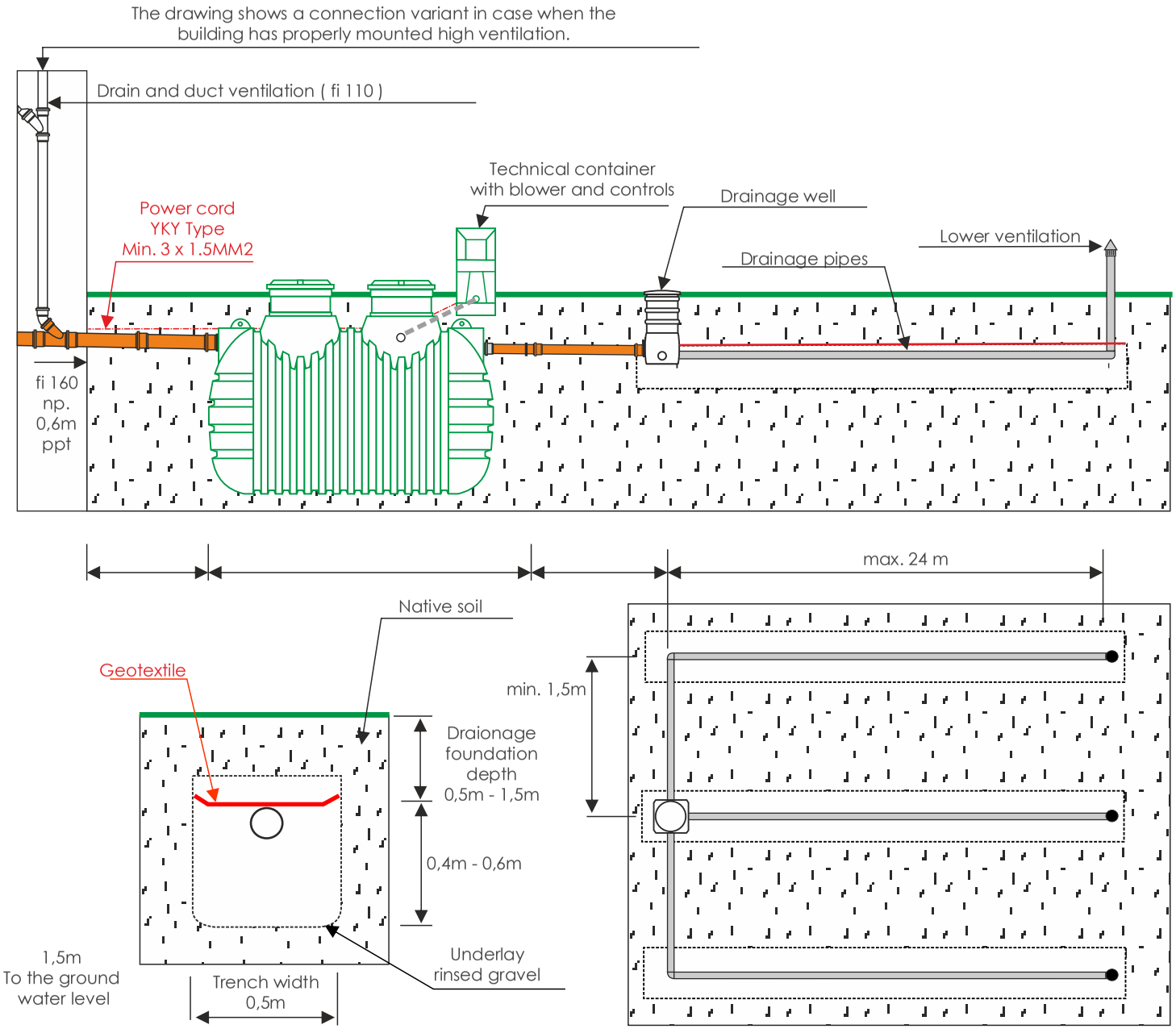
Noumber of users and daily flow	Lenght of drain. on gravel	Type of biological treatment plant	
PE - m^3/d	m	Single-wall	Double-wall
≤ 4 - 0,60	48	ZBS-4C	ZBS-5C
≤ 5 - 0,75	48	ZBS-6C	ZBS-5C
≤ 6 - 0,90	48	ZBS-6C	ZBS-7C
≤ 7 - 1,05	60	ZBS-8C	ZBS-7C
≤ 8 - 1,20	60	ZBS-8C	ZBS-10C
≤ 10 - 1,50	72	ZBS-10C	ZBS-10C
≤ 12 - 1,80	96	ZBS-12C	ZBS-12C

Table for selecting the lenght of drainage on rinsed gravel (in the embankment) to the number of users (flow) and type of bio. tratment plant.

Noumber of users and daily flow	Lenght of drain. on gravel	Type of biological treatment plant w/ pump	
PE - m^3/d	m	Single-wall	Double-wall
≤ 4 - 0,60	48	ZBS-6C/KP	ZBS-5C/KP
≤ 5 - 0,75	48	ZBS-6C/KP	ZBS-5C/KP
≤ 6 - 0,90	48	ZBS-6C/KP	ZBS-7C/KP
≤ 7 - 1,05	60	ZBS-10C/KP	ZBS-7C/KP
≤ 8 - 1,20	60	ZBS-10C/KP	ZBS-10C/KP
≤ 10 - 1,50	72	ZBS-10C/KP	ZBS-10C/KP
≤ 12 - 1,80	96	ZBS-12C	ZBS-12C

Table for selecting the number of absorbent wells to the number of users (flow) and type of bio. tratment plant.

Noumber of users and daily flow	Absorbnent wells	Type of biological treatment plant	
PE - m^3/d	pcs./type	Single-wall	Double-wall
≤ 4 - 0,60	1 x SCH100	ZBS-4C	ZBS-5C
≤ 5 - 0,75	2 x SCH100	ZBS-6C	ZBS-5C
≤ 6 - 0,90	2 x SCH100	ZBS-6C	ZBS-7C
≤ 7 - 1,05	2 x SCH100	ZBS-8C	ZBS-7C
≤ 8 - 1,20	2 x SCH100	ZBS-8C	ZBS-10C
≤ 10 - 1,50	2 x SCH100	ZBS-10C	ZBS-10C
≤ 12 - 1,80	3 x SCH100	ZBS-12C	ZBS-12C



The minimum distance for sewage tanks and treatment plants form other buildings:

- 2m from the plot border, public road or pavement.

- 5m from windows and exterior doors to the rooms designated to accomodate people.

- 1,5m from drainage to the highest groundwater level.

Well constituting a drinking water shoud be according to the same regulations away at least:

- 15m from tanks collecting waste (settling,cesspools) and similar sealed containers.

- 30m (70 m) from infiltrating drainage

13.1 - Sets of biological treastment plants (on Packages)

Noumber of users and daily flow	Lenght of drain. on gravel	Type of biological treatment plant	
PE - m^3/d	m	Single-wall	Double-wall
≤ 4 - 0,60	18 x PRO-1R	ZBS-4C	ZBS-5C
≤ 5 - 0,75	24 x PRO-1R	ZBS-6C	ZBS-5C
≤ 6 - 0,90	24 x PRO-1R	ZBS-6C	ZBS-7C
≤ 7 - 1,05	36 x PRO-1R	ZBS-8C	ZBS-7C
≤ 8 - 1,20	36 x PRO-1R	ZBS-8C	ZBS-10C
≤ 10 - 1,50	48 x PRO-1R	ZBS-10C	ZBS-10C
≤ 12 - 1,80	48 x PRO-1R	ZBS-12C	ZBS-12C

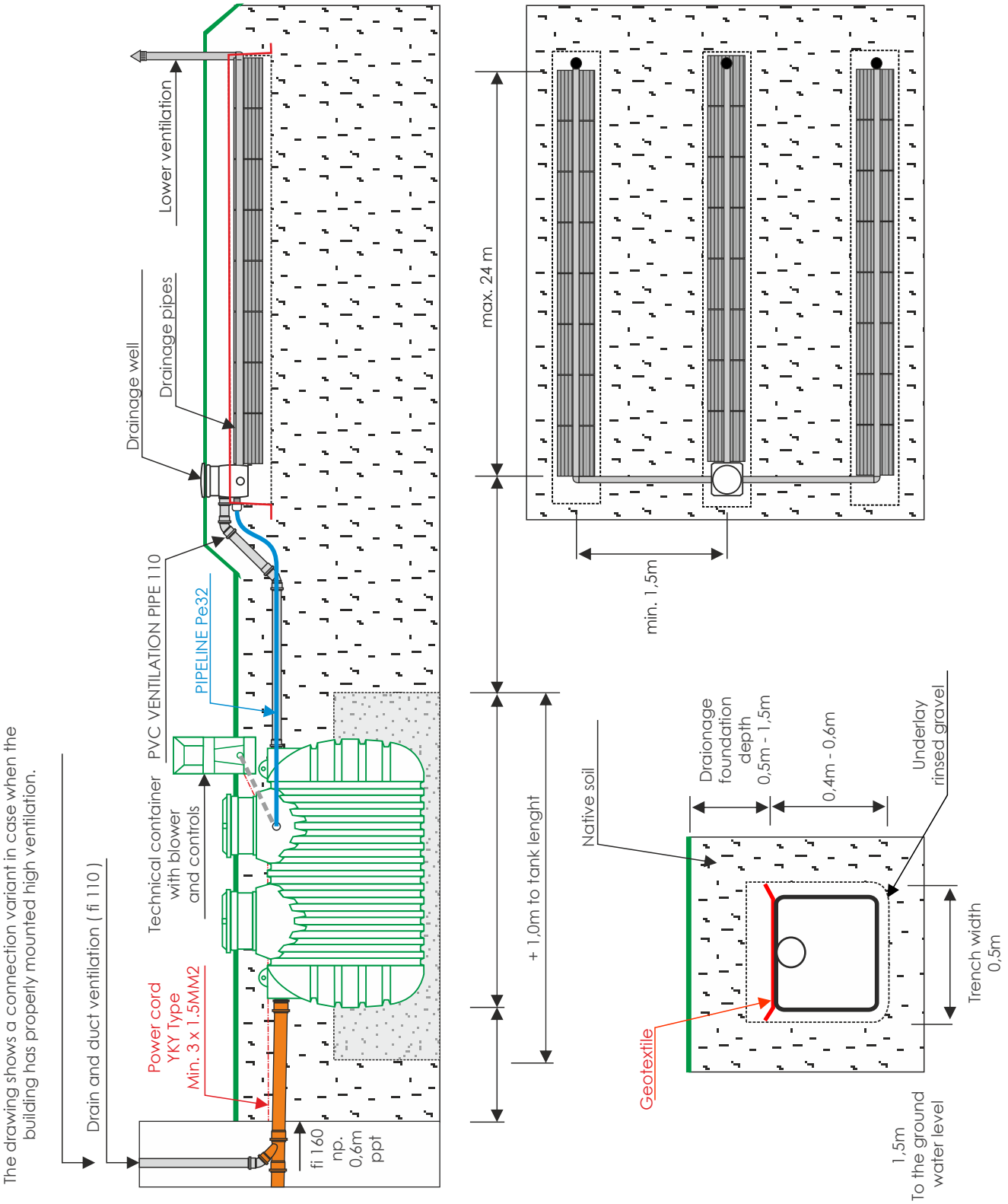
Table for selecting the lenght of drainage on rinsed gravel (in the ground) to the number of users (flow) and type of bio. tratment plant.

Noumber of users and daily flow	Lenght of drain. on gravel	Type of biological treatment plant w/ pump	
PE - m^3/d	m	Single-wall	Double-wall
≤ 4 - 0,60	18 x PRO-1R	ZBS-6C/KP	ZBS-5C/KP
≤ 5 - 0,75	24 x PRO-1R	ZBS-6C/KP	ZBS-5C/KP
≤ 6 - 0,90	24 x PRO-1R	ZBS-6C/KP	ZBS-7C/KP
≤ 7 - 1,05	36 x PRO-1R	ZBS-8C/KP	ZBS-7C/KP
≤ 8 - 1,20	36 x PRO-1R	ZBS-8C/KP	ZBS-10C/KP
≤ 10 - 1,50	48 x PRO-1R	ZBS-10C/KP	ZBS-10C/KP
≤ 12 - 1,80	48 x PRO-1R	ZBS-12C	ZBS-12C

Table for selecting the lenght of drainage on rinsed gravel (in the embankment) to the number of users (flow) and type of bio. tratment plant.

Noumber of users and daily flow	Absorbnent wells	Packages in well	Type of biological treatment plant	
PE - m^3/d	pcs./type	pcs./type	Single-wall	Double-wall
≤ 4 - 0,60	1 x SCH100	2 x PRO-SCH	ZBS-4C	ZBS-5C
≤ 5 - 0,75	2 x SCH100	1 x PRO-SCH	ZBS-6C	ZBS-5C
≤ 6 - 0,90	2 x SCH100	1 x PRO-SCH	ZBS-6C	ZBS-7C
≤ 7 - 1,05	3 x SCH100	1 x PRO-SCH	ZBS-8C	ZBS-7C
≤ 8 - 1,20	3 x SCH100	1 x PRO-SCH	ZBS-8C	ZBS-10C
≤ 10 - 1,50	2 x SCH100	2 x PRO-SCH	ZBS-10C	ZBS-10C
≤ 12 - 1,80	2 x SCH100	2 x PRO-SCH	ZBS-12C	ZBS-12C

Table for selecting the number of absorbent wells to the number of users (flow) and type of bio. tratment plant.


The drawing shows a connection variant in case when the building has properly mounted high ventilation.
Drain and duct ventilation (fi 110)
Power cord YKY Type Min. 3 x 1.5MM2
Technical container with blower and controls
PVC VENTILATION PIPE 110
PIPELINE Pe32
Drainage well
Drainage pipes
Lower ventilation
fi 160 np. 0,6m ppt
max. 24 m
+ 1,0m to tank lenght
min. 1,5m
Native soil
Draionage foundation depth 0,5m - 1,5m
0,4m - 0,6m
Underlay rinsed gravel
Geotextile
Trench width 0,5m
1,5m To the ground water level

JDK-S-60, parameters:
- performance: 85 l/min -150 mbar, 60 l/min - 200mbar
- Power: 40 W przy 200 mbar
- Example application: ZBS-4C, ZBS-6C

JDK-S-80, parameters:
- performance: 90 l/min -150 mbar, 75 l/min - 200mbar
- Power: 50 W przy 200 mbar
- Example application: ZBS-6C, ZBS-8C, ZBB-7C

JDK-S-100, parameters:
- performance: 110 l/min -150 mbar, 95 l/min - 200mbar
- Power: 75 W przy 200 mbar
- Example application: ZBS-8C, ZBB-7C, ZBB-10C

JDK-S-120, parameters:
- performance: 140 l/min -150 mbar, 120 l/min - 200mbar
- Power: 95 W przy 200 mbar
- Example application: ZBB-10C, ZBB-12C, ZBS-10C

JDK-S-150, parameters:
- performance: 180 l/min -150 mbar, 150 l/min - 200mbar
- Power: 115 W przy 200 mbar

JDK-S-200, parameters:
- performance: 220 l/min -150 mbar, 200 l/min - 200mbar
- Power: 180 W przy 200 mbar

JDK-S-250, parameters:
- performance: 270 l/min -150 mbar, 250 l/min - 200mbar
- Power: 225 W przy 200 mbar

JDK-S-300, parameters:
- performance: 375 l/min -150 mbar, 300 l/min - 200mbar
- Power: 230 W przy 200 mbar

JDK-S-400, parameters:
- performance: 460 l/min -150 mbar, 400 l/min - 200mbar
- Power: 360 W przy 200 mbar

JDK-S-500, parameters:
- performance: 545 l/min -150 mbar, 500 l/min - 200mbar
- Power: 450 W przy 200 mbar

14.1- Accessories (EBARA submersible pumps)

OPTIMA MA, parameters:
- performance/lift: 120 l/min / 3,3m , 40 l/min / 6,5m
- Power: 250 W, 1-phase
- Conncetion Dimension 5/4 cala (pipe PE32-PE40)
- Can Through the Particle: 10mm
- example pumping stations: P60,/1,4, P60/2,0, P60-80/2,1

BEST 2 MA parameters:
- performance/lift: 200 l/min / 5,3m , 120 l/min / 8,3m
- Power: 550 W, 1-phase
- Conncetion Dimension 1 1/2 cala (pipe PE40-PE50)
- Can Through the Particle: 10mm
- example pumping stations: P60/2,0, P60-80/2,1, P100/1,9

BEST 3 MA parameters:
- performance/lift: 260 l/min / 4,0m, 120 l/min / 9,5m
- Power: 750 W, 1-phase
- Conncetion Dimension 1 1/2 cala (pipe PE40-PE50)
- Can Through the Particle: 10mm
- example pumping stations:P60/2,0, P60-80/2,1, P100/1,9

RIGHT 100 MA parameters:
- performance/lift: 200 l/min / 3,4m, 120 l/min / 7,6m
- Power: 750 W, 1-phase
- Conncetion Dimension 1 1/2 cala (pipe PE50-PE63)
- Can Through the Particle: 35mm
- example pumping stations: P60/2,0, P60-80/2,1, P100/1,9

DW VOX 100 MA parameters:
- performance/lift: 400 l/min / 3,7m, 200 l/min / 6,7m
- Power: 750 W, 1-phase
- Conncetion Dimension 2 cale (pipe PE63-PE75)
- Can Through the Particle: 50mm
- example pumping stations: P60/2,0, P60-80/2,1, P100/1,9

DW VOX 150 MA lub M., parameters:
- performance/lift: 400 l/min / 6,1m, 200 l/min / 9,0m
- Power: 1100 W, 1-phase
- Conncetion Dimension 2 cale (pipe PE63-PE90)
- Can Through the Particle: 50mm
- example pumping stations: P100, P120, P150

DW VOX 200 parameters:
- performance/lift: 400 l/min / 8,3m, 200 l/min / 11,2m
- Power: 1500 W, 3-phase,
- Conncetion Dimension 2 cale (pipe PE63-PE110)
- Can Through the Particle: 50mm
- example pumping stations: P100, P120, P150

DW VOX 300 parameters:
- performance/lift: 400 l/min / 12,6m, 200 l/min / 14,7m
- Power: 2200 W, 3-phase
- Conncetion Dimension 2 cale (pipe PE63-PE110)
- Can Through the Particle: 50mm
- example pumping stations: P100, P120, P150

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