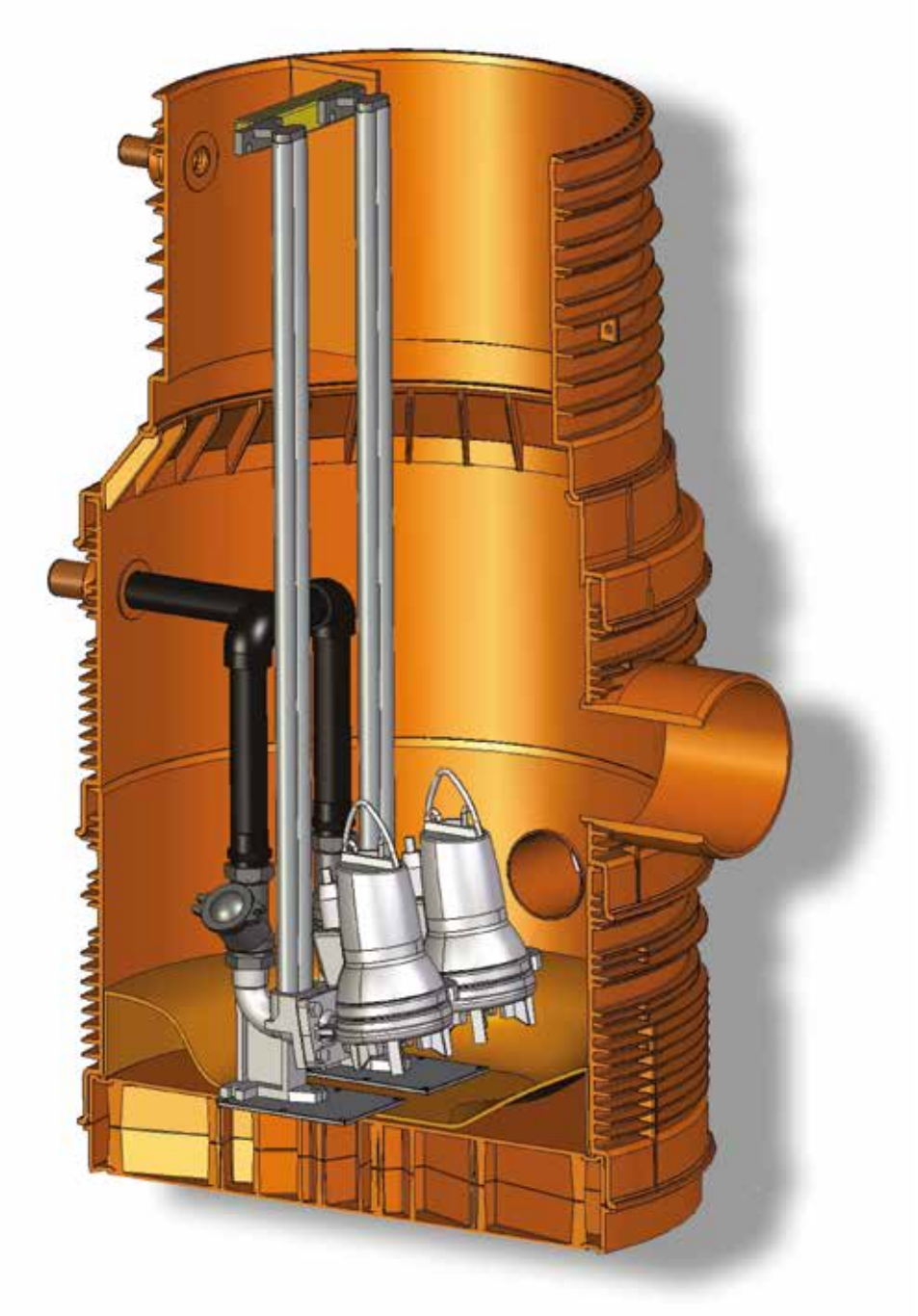
PROFOS
MODULAR SEWAGE PUMP STATION



Modular sewage pump station.

PIPELIFE
always part of your life

CONTENTS

1 INTRODUCTION

1.1 What is PROFOS?

PROFOS is a product of Pipelife Bulgaria which is destined to fill up the scale of products in the infrastructure sewage nets and systems.

PROFOS modular sewage pump station for waste and drainage waters is offered as a final product ready for installation.

1.2 Why should we choose PROFOS?

Very often using sewage pump station is economically more profitable solution than establishing a treatment facility or than unnecessary, groundless digging of the sewage net.
They have become an efficient solution allowing the designers to choose the most appropriate configuration and type of construction which form a completed SPS (Sewage Pump Station).
Using concrete tanks or manholes for SPS has become necessary due to the following arguments:

- An opportunity to be assembled at the spot;
- Relatively low price;
- Easy assembling in/outlets.

This doesn't make them preferred by the investors in comparison with their disadvantages:

- Bad leak-tightness;
- Low connections strength;
- Fragility;
- Especially high costs for transportation and assembly.

The necessary requirements for leak-tightness in accordance with the European standards, the growing influence of ecological factors and the implementation of modern materials and technology "put pressure" on the investors to turn to thermo-plastic systems for making of tanks or manholes for sewage pump stations.

1.3 PROFOS advantages

- Final ready product-intelligent construction and compact design;
- Ready design solution which meets all your requirements;
- A broad scale of offers;
- Saves time and money;
- Easy connection to the existing sewage net;
- Leak-tightness and strength-high quality materials;
- Low exploitation costs and long life;
- Small size, low weight-easy transport and assembly;
- Big depth of laying;
- Stability and reliability;
- Long life at work with aggressive liquids;
- Low noise level.

1.4 PROFOS applications?

- When draining homes, buildings, complexes, small industry plants and others which are situated low in relation to the sewage net;
- For reducing the digging of the sewage net;
- For pumping of waste and atmospheric waters from low situated regions;
- For getting over hills, water currents, roads railways and others;
- For pumping of waters from rainwater tanks;
- For pumping of waste waters towards treatment stations, water tanks.

1.5 What kind of waste waters can PROFOS carry?

- Drainage waters;
- Atmospheric waters;
- Waste waters from buildings, complexes and so on;
- Technology waters from different industry applications;
- Untreated “raw” waters towards WWTP;
- Waste waters with high concentration of fibres;
- Waste waters with gasses dissolved in them.

2 ACCORDING TO WHICH STANDARDS ARE PROFOS MADE?

2.1 Why are standards necessary?

The standards are a combination of rules and norms based on practical and theoretical observations and research of the technical parameters which the products should meet. They define minimal requirements for quality of the specific product. At the same time they guarantee compatibility of products made from different manufacturers.

All this makes the standard extremely important because it guarantees to all the parties: designers, engineers, architects construction clients, control authorities and others that the product they use meets the specific application and possesses all the necessary qualities for allowing an unhindered, flawless and long-term exploitation.

2.2 What standards PROFOS meets?

Pipelife’s Sewage pump stations (SPS) PROFOS and its composite elements are sized and standardized according to all European and Bulgarian requirements:

- EN 476:2011 - General requirements for components used in drains and sewers
- DIN 16961-1:2018 - Thermoplastics pipes and fittings with profiled wall and smooth pipe inside - Part 1: Classification and dimensions
- EN 13598-2:2020 - Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for manholes and inspection chambers
- EN 13476-3:2018+A1:2020 - Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B
- DVS 2207-4 - Welding thermoplastic materials - hot-gas extrusion welding of pipes, piping parts, fittings and panels
- EN 14396:2004 - Fixed ladders for manholes
- EN 12201-2:2011+A1:2013 - Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 2: Pipes - National Annex to EN 12201-2:2011

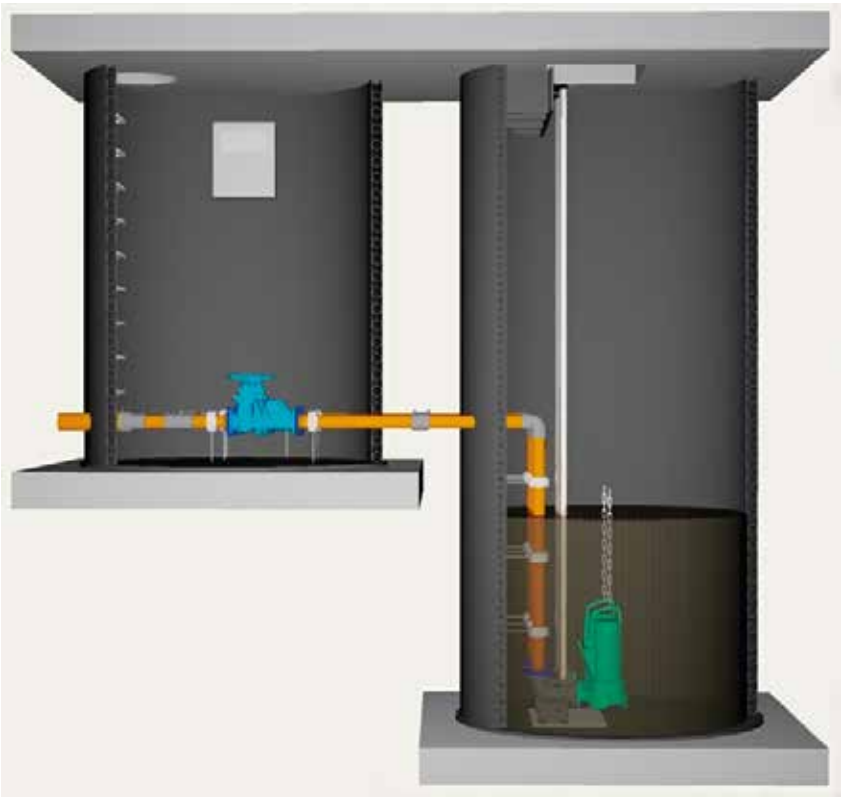
2.3 General requirements for design and realization of SPS

- The number of the pump stations must be defined on the basis of technical-economic analysis and comparison of the variants for solutions.
- The locations for building of pumps stations must be, if possible, close to discharge channel or water receiver.
- In case of pumping settlement waste waters before the draw tank must be designed grids or cutters for retaining or breaking to pieces of bigger undissolved admixtures which are contained in the arriving sewage waters. Their cleaning from the exploitation company is compulsory.
- The water level in the draw tank at which the pumps’ start-up happens must be sized so that at start-up the pumps electric motors must be submerged.
- The pumps type must be selected in accordance with the sizing quantity of the waste waters and the necessary general pressure and in accordance with the waste waters quality characteristics. There must be at least one working pump and one spare pump. At specific cases can be used a pump station with one pump.
- Pumps aggregates control is made by level switches, signalling apparatus, floats, electrodes ultrasonic probes, pressure sensors, watch breaker, etc., mounted in the manholes.
- In case of joint work of two or more aggregates the control system must assure an opportunity for change in the sequence of their start-up and switch off.
- The control system must assure also start in series of working mode of the working and the spare pump aggregates.

3 WHAT ARE THE COMPOSITE PARTS OF PROFOS?

In order to keep high functionality and long service life of PROFOS the following aspects are taken into consideration:

- General costs for producing the pump station;
- Energy costs;
- Easy transportation and installation;
- Water tightness;
- Durability and low weight.



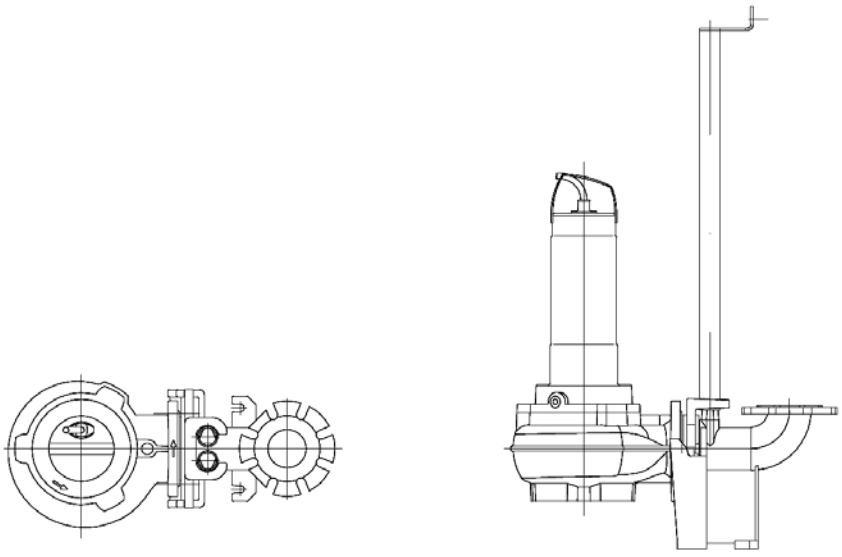


Fig.1 General scheme of auto-joining system

4 PROFOS TECHNICAL CHARACTERISTICS AND PARAMETERS

4.1 Manhole-draw tank

The sizes of the manholes in which is designed to be mounted the pumps are defined according to:

- The number and the dimensions of the pumps;
- The necessary effective volume for pumps proper work according to incoming capacity;
- The bottom elevation of the carrying pipeline. In case of bigger depth in relation to the terrain elevation it is appropriate to use manhole with a bigger diameter e.g. bigger existing volume respectively less digging of PROFOS as a whole;
- The necessity of providing enough space around the pump's aggregates, pipelines, valves etc., for easy and convenient control, repair or substitution.

The used manholes according to the diameter type are the following:

PRO800
PRO1000
PRO PRAGNUM 1200
PRO PRAGNUM 1300
PRO PRAGNUM 1500
PRO PRAGNUM 1800
PRO PRAGNUM 2000
PRO PRAGNUM 2200
PRO PRAGNUM 2500

Manholes sides and bottom are protected against water rise in case of high underground waters.

For the purpose of easy exploitation the manholes ends with a fixed inlet DN1000/800 for DN1000 manhole and without a cone for DN800 and DN630 manholes. For the PRAGNUM type manhole a cone is not used but a reinforced concrete plate with a DN 800 opening on which the cover concrete ring is mounted. Next is a cover with 800 mm outlet - DN 800 (for the PRO 630 manholes, the cover is DN 600) with a different degree of loading according to EN 124 (A15, B125, D400).

4.2 Defining the position and the type of discharging pipe and necessary valves

- Pipeline, fittings and adaptors – the material is in accordance with the pressure, the allowed minimal and maximal velocities, the quality characteristics of the waste waters and the soil. The connections can be butt welding, electrofusion or with adaptors from flange to polyethylene or steel;
- Turncocks – after the Non-return valves (with flanges or quick connect);
- Ball non-return valves – after the pumps (with flanges or quick connect).

4.3 Used pumps and elements in the PROFOS stations

4.3.1 General information about the used pumps

The submerged type of pumps for waste waters represent an aggregate which consists of a pump part the necessary connecting elements for the different installation types and an electric engine. It is possible to connect the pump with the help of a special base to the manhole's bottom for the purpose of easier assembly and disassembly – auto-coupling system or to couple with pipes and other valves for discharging pipe – free-standing pumps. The electrical supply to the pump is made by one or more flexible wires with the appropriate length.

The electric engine is "dry" coupled with short-circuit rotor which covers a wide range of applications and loads. The engine and the pump usually share a common shaft with bearings and shaft's sealings. The engine has a watertight inlet and a handle for lifting the pump.

4.3.2 Impeller types of pumps

Impeller type is chosen based on the wastewater type. Impeller type can be vortex, semi-open, open single channel, closed single channel, with grinder etc.
The free passage of the pump concept has a special importance for the waste water pumps. The free passage of the pump is the pump's ability to carry solid particles along with the liquid e.g. not to block up. The size of the free passage of the pump is defined as the biggest spherical object and can pass through the pump's impeller and cover.

The ordinary free passage of the pump of 80 mm is enough for the small and the medium size waste water pumps. For the big ones it must be minimum 100 mm.

4.3.3 Material used in the pumps' construction

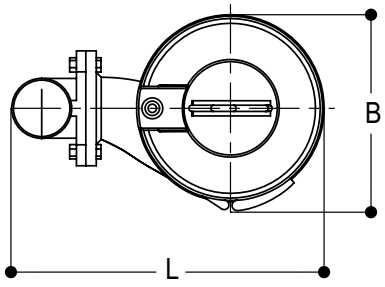
Cast iron is the basic material used for the waste water submerged pumps. In most cases the pump's shaft is made entirely or with a cover of stainless steel for being resistant to the contact with the working liquid. The steel parts of the pump's construction or its base are entirely deeply galvanized and can resist decades of standard work with waste waters.

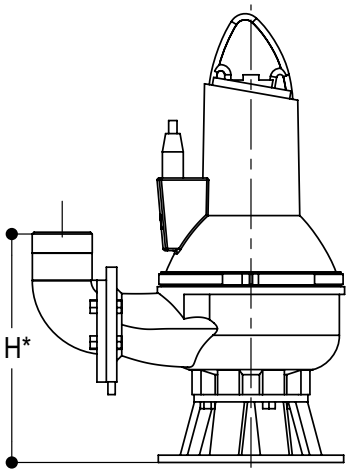
In case of industrial waste waters the resistance of cast iron is not enough and it is necessary to use parts of stainless steel especially for the pump's impellers and cover. It is known that they are a subject of great wearing out. For these applications the anticorrosive layer wears out fast which leads to fast corrosion of the surfaces. The pumps made of entirely from stainless steel are used in industry and are generally three-four times more expensive from the pumps made from standard materials.
The cover of the supply cables for the submerged pumps must be resistant to oils and other reactives which are contained in the waste waters. The other "rubber" parts like the O-rings are made of sodium and neoprene in order to be resistant to the chemicals and the oils.

4.3.4 Pipes assembly type

- Free-standing

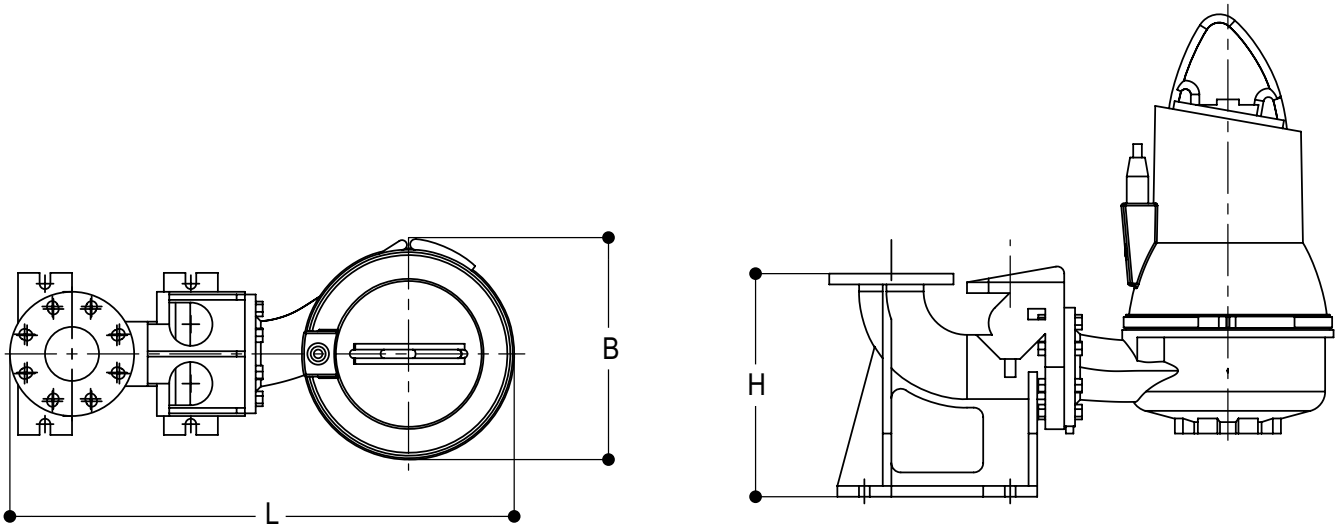
Used for a temporary or service assembly with additional base stands or ring stand in order to provide enough free space under the pump to avoid its blocking or clogging. The pump can be connected to a hard pipeline or to a hose.





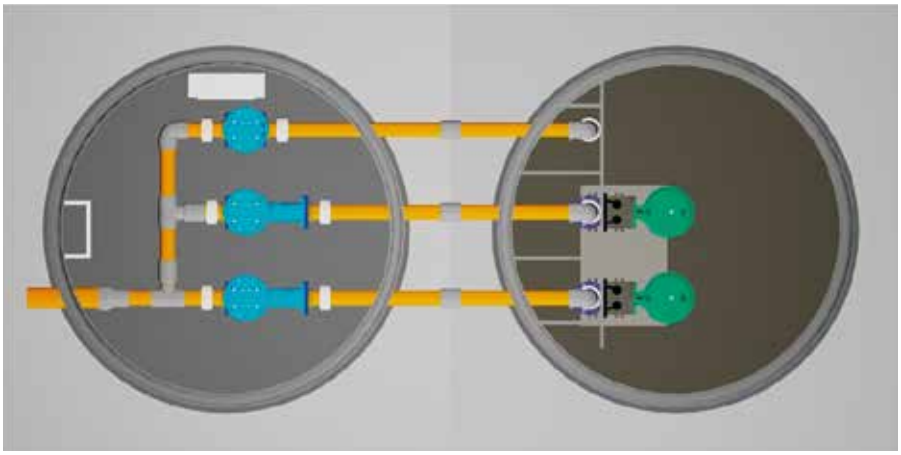
- Auto-coupling system

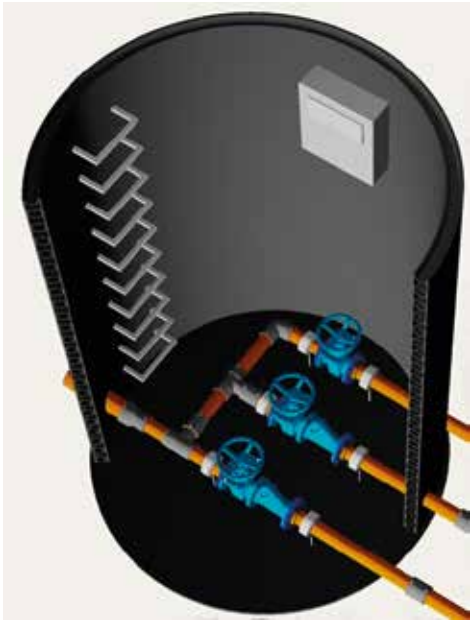
It consists of carriage for connection between the pump and the base of the auto-coupling system, the base itself with and without a flange (depending on the pump type) and upper hold for the leading rails. By the guide rails the pump is positioned to the base of the auto-coupling system.



- Valves manholes

When it is not possible to install the valves in the sewerage pump station, an additioanal manhole is is planned for for installation of distribution pipes, valves, reductions and other equipment. It is made is PRO type manholes with an opportunity for revision with a ladder and a cover for the corresponding load. It is situated after the pump station and it's dimensions are depending on the number of pumps, valves etc..





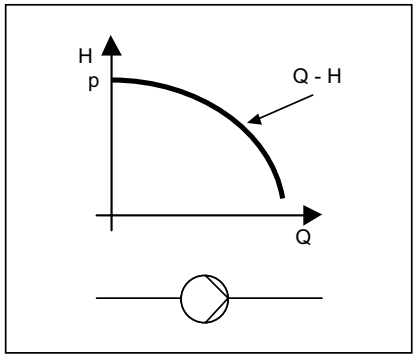
5 WHAT IS THE NECESSARY DATA FOR PROFOS DESIGN?

When defining the location of the sewerage pumps stations it must be taken into account the terrain topographic characteristics, the availability of electricity supply, geological and hydro-geological conditions and the opportunity for an easy and suitable access, the danger of overflow etc.

5.1 Pumps characteristics

The main feature is the relation between the pump's pressure and the capacity. It is necessary to pay attention to possible limitations which can be caused by cavitation, vibrations or engine overload. Another important feature of the pumps – Efficiency curve, also a capacity function. For the submerged pumps the Efficiency of the aggregate is defined as well as the pump's Efficiency. Their difference is the engine Efficiency.

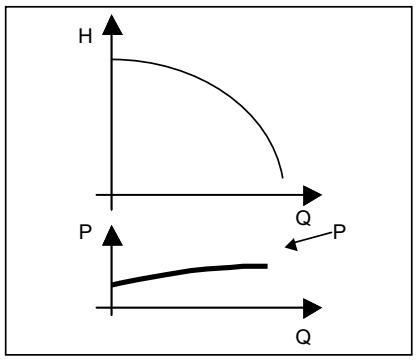
Q x H curve
On this diagram is shown the characteristic curve of the pump where Q (capacity) is on **X** axis, while H (pressure) or p (pressure) is on **Y** axis.
Q = m^3/H; l/s; m^3/s
H = mWc;
p = kPa



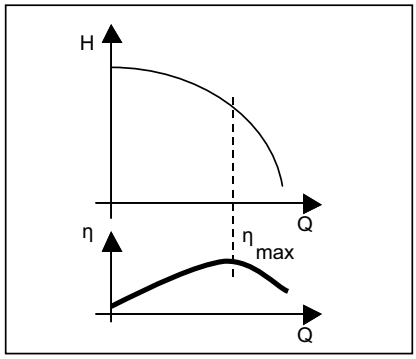
Power curve
Power curve shows the power P on Y axis and Q on X axis.

$$P = \frac{Q \times p}{\eta} \quad \text{or} \quad P = \rho \times g \times \frac{Q \times H}{\eta}$$

Q = capacity [m^3/s];
η = efficiency;
ρ = density [kg/m^3];
g = acceleration [m/s^2]
P = W; kW;

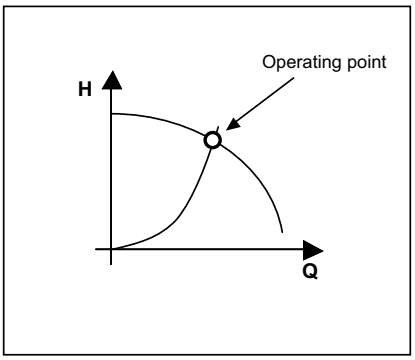


Efficiency curve
The curve shows η (efficiency) of the pump.
Efficiency is measured in %.
Every pump has its best work point (η_{max}), where it works with an optimal effectiveness.
Pump's effectiveness depends on its dimensions and structure's quality.



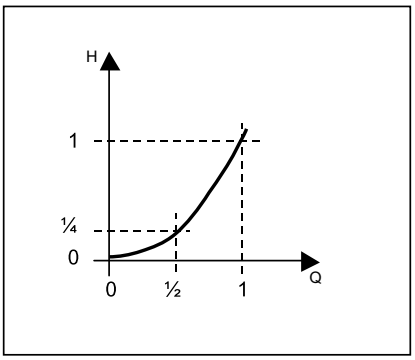
Operating point

The work point is the point of intersection of Q-H curve with the system characteristic curve.



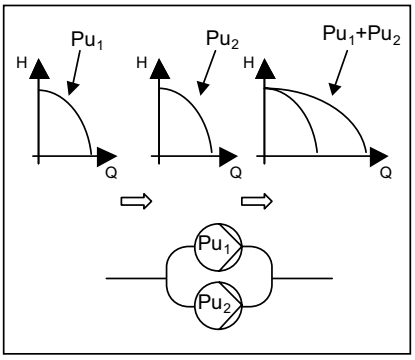
System characteristic curve

The common thing about all characteristic curves is the connection between Q (volume) and pressure (H). If Q is reduced 2 times, H will be reduced 4 times.



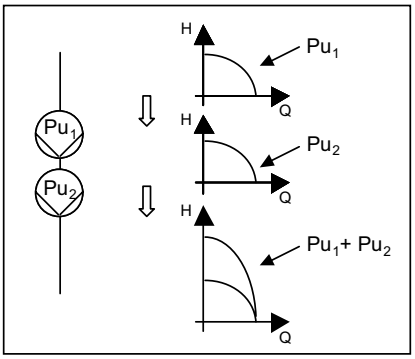
Pumps connected in parallel

For the pumps connected in parallel **Q will increase**.



Pumps connected in series

For the consecutively connected pumps **H will increase**.



5.2 Capacity

The incoming capacity is defined by one or more of the following components:

- Drainage waters (Qd) – with regard to the pumping, the quantity of drainage waters is usually less. In case of pervious soil and when the drainage system is situated above the level of the underground waters, the specific quantity of drainage waters must be defined on the basis of hydro-geological study;
- Rain water (Qr) – Depends on the accepted pumps' work mode, the intensity of the flow rate shower, the drain surface and the flow coefficient;
- Waste waters (Qi)- Waste waters capacity is defined on the basis of the facilities connected into the system, producing waste waters in the building and the simultaneousness of draining from them. Water quantity for which the pump is calibrated should not be less than the maximal hour quantity of the total water inflow.

The total incoming capacity (Q) for waste waters is the sum of the three indexes:

Q = Qd + Qr + Qi (l/s)

5.3 Pressure

The general pressure of the pumps depends on the height of pumping and the hydraulic pressure losses in the pipelines. The pressure in the pump must compensate the different resistances in the pipe system. The general pressure varies according to the water quantity in the system. As a matter of principle the counter-pressure consists of three elements:

- Geodesic pressure;
- Pressure losses in fittings;
- Pressure losses in straight pipe sections – pressure pipeline.

5.4 Velocity

The fluid velocity is defined according to the requirements for minimal and maximal velocity.
The minimal fluid velocity for the carrying pipes is:

- Vertical: 1 m/s (recommended by Grundfos) - to avoid problems with depositing;
- Horizontal (internal and external): 0,7 m/s - to avoid problems with depositing.

In order to avoid loss of pressure, the water velocity must not exceed 2,3 (2,5) m/s.

5.5 Pump's wearing out factors

The availability of sand in the waste waters leads to low, usually 0.002 and 0.003 volume %. But it is possible to be increased at its peak during heavy rains and snow melting. For such applications it is appropriate to plan a reservoir for sand separation from the general waste waters.
The pumps' behavior in abrasive environments depends on the availability of quartz and silicate sand. When there is high contents of sand the liquid density increases, respectively the necessary engine power increases too. Usually 30% reserve is planned in the nominal power.
Pump's wearing out factors are the following:

- Sand concentration in the fluid;
- Sand quality;
- Pump's materials;
- Impeller type.

Pump's wearing out can be minimized with the usage of durable materials and appropriate choice of construction.

5.6 Draw tank

The draw tank of the sewage pump station plays the role of equalizer between the inflow during the different hours of the 24-hour period and the pumps' capacity..

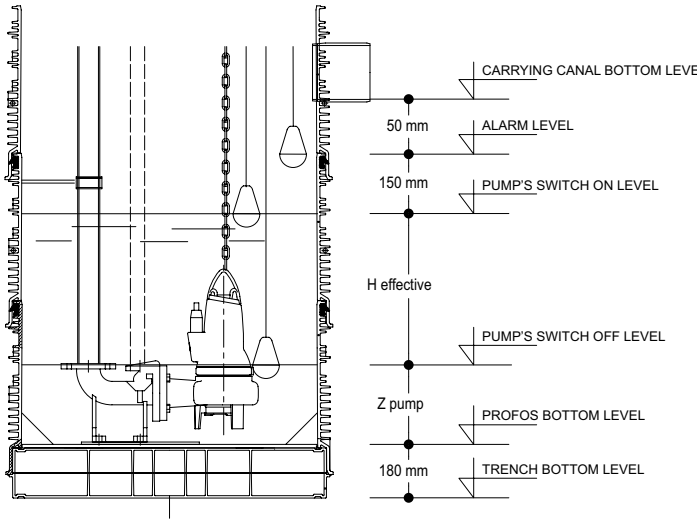
5.6.1 General requirements for design:

- The draw tank capacity of the sewerage pump stations is defined on the basis of the quantities of the incoming and pumped waste waters during the hours of the 24 hour period with maximal quantity of incoming waste waters. The minimal draw tank capacity can be defined by five-minute discharge of the pump with the highest efficiency;
- The maximal water level in the draw tank must be at least 10 cm lower than the elevation of the carrying pipeline or drain;
- The minimal water level must such, so that there is not air suction or appearance of vibrations. The stop level switch must be positioned in a way that the pump stops work before the liquid level becomes lower than the upper part of the cramp over its hydraulic part;
- It must be avoided formation of the so called “dead zones”;
- It must be assured easy and safe access for cleaning and repair.

5.6.2 Parameters defining the working (efficient) volume of the draw tank:

- “Dead volume” (Z pump – the distance between the manholes bottom and the level for pump’s switching off-see Diagram 2). This distance is defined by the pump’s type which will be used and it is extremely important to prevent dry running of the pump and suction of air;
- “Useful volume” (H effective-see Diagram 2) This is the effective volume for work of the pump station. It is defined according to the inflow schedule and the pumps’ work. It depends on their type and how many times they can switch on within one hour. The appropriate secection reduces the fluctuations during work between the basic pump’s capacity parameters – Q, pressure – H and efficiency – η.

The minimal „useful volume“ of the draw tank would lead to more frequent pump’s switching on and would shorten its life. Resized „useful volume“ would lead to sedimentation and accumulation of deposits, blockings and impeding pumps’ work.



Фигура 2 Draw tank

5.7 PROFOS pressure pipeline-discharging pipe

The definition of the diameters of the pressure pipeline-discharging pipe is based on:

- Flow rate;
- Velocities at which the losses are minimal;
- The allowed minimal velocities for movement of waste waters;
- The danger of waste waters rotting when the stay is bigger in the pipelines;
- The danger of clogging;
- The pipeline material must be in accordance with the pressure requirements, quality characteristics of waste waters and the soil;
- The pipelines must be resistant to external and internal loads and to be watertight.

5.8 Project documentation preparation

Pipelife offers the designers preparation of a project of a sewage pump station in accordance with the standards and the requirements which are applicable to the final product of your investment projects.

The project, prepared by our engineers includes:
1 Selection of the appropriate pump aggregate-one or two in accordance with the specific situation
2 Pump's type with technical parameters, work diagrams, drawings of the details
3 Manholes selection, equipment with the selected pump aggregate, assembly and pipeline connections
4 Situating on the desired by the investor spot
5 Detailed drawings and profiles of the specific design situation
6 Technical note with calculations
7 Assembly and exploitation conditions
8 Price of the selected product

In order to prepared the above mentioned project documentation it is necessary to submit the following data (see Table 1):

Necessary parameters	Designation	Data
Waste water capacity (l/s or m3/h)	Q	
Waste water type		
H - Geodesic in (м)	H geodetic	
Subterranean waters – height in (м)	H sw	
Traffic load in (tons)	D	
Elevation level, where PROFOS will be situated	KT=	
Tanks type and elevation in relation with the terrain	BP inlet	See note under the Table
Length(m) and Diameter (mm) of the connecting pipe between the pump station and the tank or the draw tank	L	
Outlet (Diameter, type, elevation with relation to the terrain)	BP outlet	
Inlet 1 (Diameter, angle, type, elevation with relation to the terrain)	BP1	
Inlet 2 (Diameter, angle, type, elevation with relation to the terrain)	BP2	
Inlet 3 (Diameter, angle, type, elevation with relation to the terrain)	BP3	

Table 1 Initial data for preparation of project documentation

Note (see Table7):
1) Tank's type:
- Existing sewage network – diameter and pipeline bottom elevation of discharge;
- Existing manhole – manholes diameter and manhole bottom elevation in relation to the terrain;
- Treatment station – elevation of connection according to the designer's plan.

2) Angle of connection - measured clockwise where the outlet (discharge pipe) is accepted as 0º!
3) Elevation in relation to the terrain - the difference between the elevation level and the bottom of the carrying seage pipe.

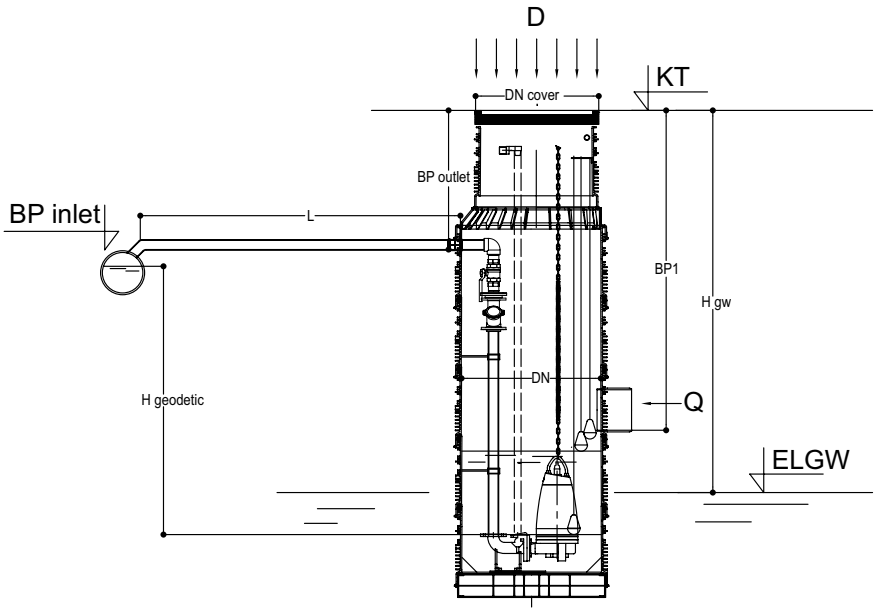


Diagram 1 Designation of data necessary for project documentation preparation.

6 PROFOS ASSEMBLY

6.1 PROFOS assembly

The facilities assembly must be in accordance with the design and terrain conditions. Their proper execution guarantees long and problem free exploitation life.

6.2 PROFOS laying advantages

- Fast and easy assembly;
- Final product ready for laying;
- Variant of reinforcement against high underground waters;
- Easy connection with the existing sewerage;
- An opportunity for inspection chambers extension to the necessary elevation terrain;
- No need of special mechanization for laying;
- No need of shuttering.

6.3 PROFOS assembly requirements

A pit should be excavated corresponding to the installation layout and to the dimensions and ground elevations specified in the drawing. For ease of installation and piping connection a distance of about 50 cm between the excavation pit and the buffer tank is needed. The pit reinforcement should be designed in consideration of the gradient and the type of soil. Upon completing the reinforcement the bottom should be compacted and covered with a 10 cm sand cushion on which a 20 cm concrete padding should be poured in consideration of defined dimensions. It is made of concrete grade Б10 including a lower gridded reinforcement Ø8 (every 10 or 15 cm – see the installation layout). The concrete pouring should be proceeded with after the padding is finished and has obtained the required strength properties. PROFOS should be checked for any factory damages or cracks resulting from its storage and carriage. Following that inspection the PROFOS pipes can be laid down in the pit. The pipes can be lowered down into the pit using a crane, a hoisting device or ropes.

The lowering of pipes should be performed slowly and taking care not to damage the equipment. For the gripping itself, if crane is used to do it, the center of gravity should be known to avoid any slipping off or crushing.

After laying PROFOS down in the pit, its bottom and the padding should be carefully compacted with sand. A special attention should be paid when tamping the sand in the area just below the middle of the buffer tank and around the side walls but mostly in the area under the buffer tank. Make sure that there are no sharp objects near the buffer tank that could harm it.

Prior to commissioning and during the installation works it is advisable and even necessary to fill PROFOS with water to the optimal efficient capacity level, i.e. the «Start» pump level in order to:

- protect the shaft from the earth mass pressure when backfilling and tamping the surrounding pit;
- avoid the floating that may result from high rise of the underground water level;
- ensure proper functioning – pumps settings and “Start-up”;
- ensure proper functioning of the level meters.

Note: In case the underground water level rise high, the shaft must be reinforced additionally.
Pipelife Bulgaria is held harmless for the cases when the instructions for installation were not observed!!!
The hydrogeological report is integrated in the feasibility study for the making and installation of the equipment. It must be presented to guarantee the performance and trouble-free operation of PROFOS pumping station.

6.4 Construction and assembly works

The price quotation does not include: the excavation works needed for the equipment installation and the installation works themselves and backfilling, the excavation works along the permanent way or external water supply and sewerage networks, vertical planning and landscaping, connecting the control board feeding to the mains.

7 STATION START UP, EX-PLOITATION AND WARRANTY

7.1 Putting into operation

The pump station is put into operation after completing the following stages:

- Manholes stationing;
- Test for leak-tightness and strength of construction and its connections;
- Regarding the design inlet and outlet elevation of the pipelines;
- Connecting of the discharging pipe with the sewerage of the urbanized territory or with the treatment facility;
- Connecting the whole system with the electrical network;
- Pump's installing with the control systems according to the manufacturer's requirements for assembly and exploitation;
- Setting-up and testing;
- To predict the traffic load or storage on the manhole and to take precautions for cover, meeting the requirements of EN 124.

In case of breaking the connection between the pump station with the ground sewerage or the sewerage of the urbanized territory and other type of irregularities which are not related to the integrity of the tank and the pump, Pipelife does not bear responsibility.

7.2 PROFOS “start up” and setting-up

Customer’s responsibilities:

All construction and installation works needed for the sewer pumping station shall be performed by the client (builder) to such a scale and extent as to allow the seaming - installation and STARTUP to be performed by the pump manufacturer’s authorized technician. It includes the following:

1. Excavation of a pit and shaping its walls and bottom in consideration of the soil specificity and safety rules.

2. The casting of reinforced concrete foundations must follow a separate structural design (the dimensions of foundations are specified in the design drawings of Pipelife Bulgaria attached to this offer and have been determined on the basis of static calculations for high level of underground water and must not be changed).

3. Fitting and leveling the draw tank pit casing and the fitting inspection chamber (if the design includes such as a separate unit from the draw tank) on the reinforced concrete foundations at the places specified in the design drawings of Pipelife Bulgaria attached to this offer.

4. If the design includes a separate draw tank pit casing and a separate fitting inspection chamber, the impeller piping of the pumps, the emptying piping of the impeller (if any), as well as the casing pipe for the power feed cables, for the level probe cable and for the cabling of sensors signaling about possible penetration of moisture in the pump motors shall be interconnected in accordance with the design drawings of Pipelife Bulgaria attached to this offer.

5. Backfilling the excavated pit and compacting the backfill in accordance with the instructions specified in the design drawings of Pipelife Bulgaria attached to this offer.

6. The draw tank pit casing and the fitting inspection chamber will be covered by reinforced concrete top cover (if the design includes such as a separate unit from the draw tank). The reinforcement must follow a separate structural design to take into consideration the dimensions of top covers as specified in the design drawings of Pipelife Bulgaria.

7. Mounting the reinforced concrete top covers on the draw tank pit casing and on the fitting inspection chamber.

8. Lowering down the pumps inside the draw tank pit casing using the guide rails and coupling them to the auto coupling system supports.

9. By the client’s request, such lowering and coupling may be performed by the pump manufacturer, in which case we should be officially notified at least five business days in advance, and the required hoisting equipment for lowering the pumps as well as client’s workers to give a helping hand must be readily available on the site. If the pumps are to be lowered on a day other than the day of performing the seaming installation and START-UP by the pump manufacturer’s authorized technician or authorized service shop, the client will have to pay for that service additionally.

10. Installing the control board in an appropriate place chosen in consideration of the site specificity but any way not farther than the shortest one of the pumps power feed cables, the level probe cable or the cabling of sensors signaling about possible penetration of moisture in the pump motors (if any). The place for installing the control board is indicated in the design drawings of Pipelife Bulgaria but if the fitting inspection chamber has been specified as the place for installation then the control board must be mounted in the fitting inspection chamber. In case the place for installation is designed to be outdoors, the control board should be mounted outdoors immediately next to the pumping station.

11. The pumps power feed cables, the cabling of sensors signaling about possible penetration of moisture in the pump motors (if any), and the level probe cable should be connected to the corresponding points, inserted through the cable casing pipe and led to the control board.

12. The control board should be powered by the electricity power distribution network and provided with emergency power feeding by means of a diesel generator (if any).

13. The draw tank pit casing must be filled with water up to the elevation of upper water level as specified in the design drawings of Pipelife Bulgaria attached to the offer.

Pipelife’s responsibilities:

- Checking the control board installation and settings;

- Trial run-up of the pumps;

STARTUP is performed only by the pump manufacturer’s authorized technicians. To perform the “start up”, all above mentioned installation conditions must be observed, pump station should be fully equipped and properly connected to an electricity power supply network.

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