

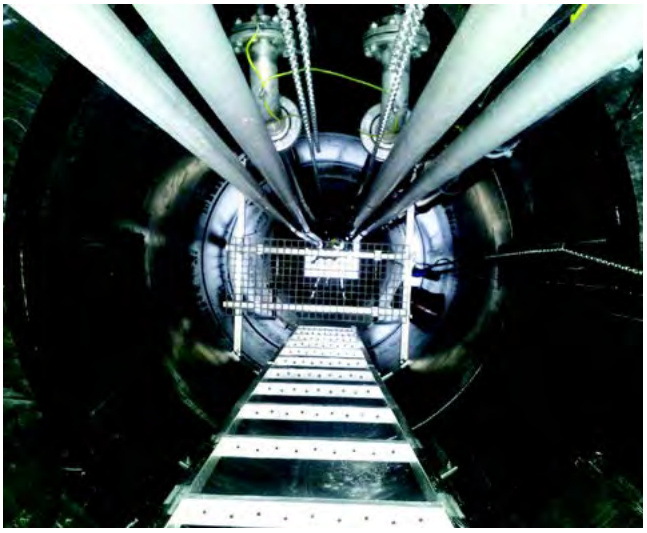
Pumping stations

WET WELL PUMPING STATIONS

Sanitary sewage pumping stations EPS are devices that are an integral part of the sewage network and are designed for the pressure transport of sewage in discharge sewers. Mixed, gravitational-pressure sewage systems are currently the most common method of sewage disposal, whose advantage is the ability to be adapted to all kinds of terrain conditions.

APPLICATION

- in places where gravitational transport is technically impossible or not economically viable
- dispersed structures - where distances between successive points of wastewater discharge are significant
- low population density - sewage discharged from households in small volumes generates low flow rates in sewage collectors
- adverse soil and water conditions - no possibility of recessing the sewage collector
- periodical sewage discharg-es - when sewage flow to the collectors is irregular



EPS pumping station
Nakło

ADVANTAGES

- reliable, proven design
- Low investment costs
- simple operation
- wide selection of pumps
- long life of the device - top quality materials
- possible to install in a carriageway area

MORE AT:
www.ecol-unicon.com/eps

CONSTRUCTION

CHAMBER

The chamber of the sewage pumping station can be made of various materials such as concrete, reinforced concrete, polymer concrete or HDPE. In the cover of the pumping station there is an opening fitted with a manhole cover made of stainless steel, HDPE or cast iron, depending on the intended use of the land where the pumping station is located. Dimensions of the manholes are adapted to the dimensions of the pumps, in order to ensure trouble-free assembly and disassembly and allow for operation and service work. Passages through chamber walls are watertight. Dimensions of the openings are adapted to the diameters of the pipelines.

Size of the chamber is adjusted to the sewage flow rate, pump dimensions and the diameters of hydraulic fittings. At the same time, the chamber acts as a sewage tank and should have an appropriate retention capacity.

In order to place the pumping station in the carriageway area, the chamber must be properly designed in terms of loading parameters.



Automation
Power supply and control switchboard with the option to connect to the BUMERANG management system

Ventilation
Ventilation ducts for air exchange in the pumping station

Chamber
Made of materials such as: concrete, reinforced concrete, polymer concrete or HDPE

Fixtures
The highest quality bolts and gates

Additional equipment
The highest quality equipment selected according to needs e.g.: ladder, service platform, cleaning system

Pumps
Submersible pumps – dedicated to the specified medium and parameters

VENTILATION

The EPS sanitary sewage pumping stations are fitted with gravitational ventilation, terminating with an odour neutraliser. The neutralization process is carried out with the use of impregnated activated carbon, which is an insert of an anti-odour pipe filter.

PUMPS

The EPS pumping stations use submersible pumps, made to the highest grade of protection IP68, suitable for operation in submerged conditions. The pump motor is cooled by the surrounding medium - sanitary sewage, in order to protect against overheating and resulting damage.

EPS Pumping stations use pumps with various impeller designs, the choice of which is determined by the nature of the pumped medium, diameter of the piping inside the pumping station and operating parameters, i.e. output and total head.

There are two main types of impellers used in sanitary pumping stations:

- impeller with a cutting knife or shredding device – The design of this impeller works well in sanitary sewage pumping stations with low capacity but high required lifting head, where the designed pipe diameter is relatively small and there is a risk of clogging the pipes with solid debris contained in domestic sewage. This impeller shreds all solids contained in the sewage into small elements that can flow freely through the discharge pipes. The danger for this type of rotor is the presence of sand in sewage, which could damage the shredding device.
- Vortex impeller – used in network pumping stations with larger capacities and discharge pipe diameters. The impeller rotates in a horizontal position, creating a centrifugal force that directs the wastewater towards the discharge stub pipe. Therefore, the medium does not flow directly through the impeller, and it only functions as the driving force for sewage transport. An important parameter in the selection of a pump with a Vortex impeller is the free flow rate, i.e. the maximum diameter of a solid particle that is able to freely pass through the impeller. Due to the type and size of elements contained in the sewage, the free passage should be min. 65 mm (ideally 80 mm). Vortex impellers are commonly used in sanitary sewage pumping stations because they are resistant to clogging.

PUMP OPERATION VARIANTS:

- alternating – each of the pumps operates at a capacity equal to the total capacity of the pumping station, at the assumed lifting head. Only one pump is running in a single cycle, while in the next cycle the other pump is switched on. The pumps serve as a reserve for each other.
- simultaneous – a system where two pumps work simultaneously, together ensuring the total capacity of the pumping station, at the assumed lifting head. Note - the total capacity of the pumping station is not a simple dependence of doubled capacity of one pump, but the resultant value of intersection of the system characteristics with the characteristic curve, showing the simultaneous operation of two pumps of a given type, provided by the pump manufacturer.

VARIANTS USED IN THE EPS PUMPING STATIONS:

- 1+1 – two pumps in alternating operation.
- 2+1 – three pumps, two working simultaneously, together providing total capacity of the pumping station, while the third one serves as a reserve. This system is used in sewage pumping stations with high sewage inflow rates.

HYDRAULIC-MECHANICAL FITTINGS:

- **Coupling elbow (coupling foot)** – is a fixed connection between the pump, chamber base and the discharge pipeline,
- **discharge pipeline** – is a pipe that discharges wastewater outside of the pumping station into the sewage system. Discharge pipes inside the pumping station are made of stainless steel or HDPE and are threaded (diameters up to DN50) or flanged (above DN50),
- **non-return valve** – protects the pumping station against backflow of the medium. The used ball valves ensure tightness and low pressure losses. Diameter of the non-return valve is equal to the diameter of the discharge pipe on which the valve is mounted,
- **gate valve** – is used to cut off or allow free flow in the discharge pipes. When gate valve is in the closed position, the flow is blocked and it is possible to inspect and service the pumping station. Gate valve can be operated by means of a wheel directly in the pumping station, by means of an articulated joint from the manhole or from the ground level by means of a spindle located in a street box,
- **guides** – used to guide the pump and place it on the coupling knee, thus enabling the pump to be automatically connected to the discharge pipe. The pump is lowered or pulled out of the pumping station using the guides. Made of stainless steel,
- **chain** – is used to pull out and lower the pump. Each pump has a separate chain attached to it. Made of stainless steel.

ADDITIONAL EQUIPMENT:

- ladder with CE marking
- service platform (for chamber H > 4 m)
- handrails
- anti-sedimentation bevels
- rinsing system
- hydrodynamic flush valve
- flow meter

POWER SUPPLY AND CONTROL SYSTEM

The power and control panel is the basic equipment of the EPS pumping station. It holds declaration of performance and CE marking, confirming compliance with the directives 2014/35/EU, 2014/30/EU. It is designed to control EPS pumping stations, it can be also integrated with the BUMERANG monitoring system.
The main task of the switchboard is maintenance-free, automatic start-up of the pumps, depending on the level of sewage in the pumping station. The level can be measured by means of a hydrostatic probe and/or float sensors.

Basic functions of the switchboard:

- pump operation: automatic or manual
- temporary switching on/off pumps in the event of a small inflow of sewage,
- sewage level measurement,
- protection of the pumps against dry running,
- optical-acoustic signalling of emergency situations, with the possibility of muting the sound signal,
- possibility of blocking simultaneous operation of the pumps,
- possibility of setting a time limit for operation of the pumps,
- calculation of operating time and number of pump starts,
- emergency control of pumps using alarm sensors.

INSTALLATION

Pumping stations chambers are delivered to construction site as a monolithic tank or in prefabricated elements. The chamber should be assembled according to the supplied instructions and dimensional drawing of the pumping station.

The next stage is the installation of internal equipment, which starts with positioning of the coupling sets, by means of which the pump is connected to the hydraulic system.

Installation of the discharge pipeline and fittings, guides and level sensors is performed after the auto coupling sets have been anchored.

Pumps are lowered by means of guides, and automatically connect to the discharge pipe attached to the auto coupling set. Installing and connecting the electrical system, power supply and control panel is the final stage

OPERATION

EPS rainwater pumping stations operate in automatic mode. Apart from the necessity to intervene in case of malfunction or periodical inspections, they require regular operational supervision of the user, in accordance with the service schedule, warranty card and operating manual delivered with the device.

During the operation of the pumping station, the following steps must be carried out on a regular basis:

- carry out basic operation/maintenance work with the frequency specified in the maintenance schedule
- increase frequency of inspecting the device in case of problems with electricity supply or during increased inflow of solids into the pumping station chamber
- all operation/maintenance and warranty activities are recorded in the pumping station Operation Book provided by Ecol-Unicon



MAINTENANCE WORK

Operation/maintenance work may only be carried out by persons who have been trained by the Manufacturer or an Authorised Service Centre of the Manufacturer.

Warranty inspections must be carried out in accordance with the inspection schedule specified in the operation and maintenance manual, by Ecol-Serwis or an Authorised Ecol-Unicon Technical Service.

ecol-serwis

www.ecol-serwis.com

PROJECTS



PUMPING STATION ELBLĄG, POLAND
Q=1800 m³/h



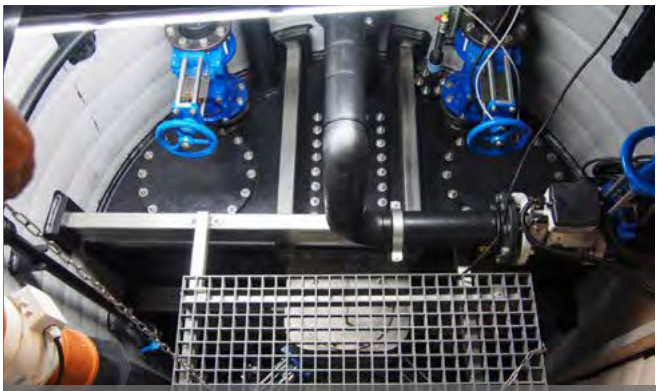
PUMPING STATION GDAŃSK, POLAND
Q=1998 m³/h



MODERNIZATION OF PUMPING STATION LUDŹMIERZ, POLAND



DRY WELL PUMPING STATION ETS IN HDPE CHAMBER, BIAŁYSTOK, POLAND, Q=25 m³/h; H=9,4 m



DRY WELL PUNPING STATIONS ESS PE, GREECE:
14pcs; Q= range between 20-314 m³/h



ACTIVE ANTI-ODOUR FILTER ENO-1300, PUMPING STATION CIECHOCINEK, POLAND



DRY WELL PUMPING STATIONS ETS, WARSAW, POLAND