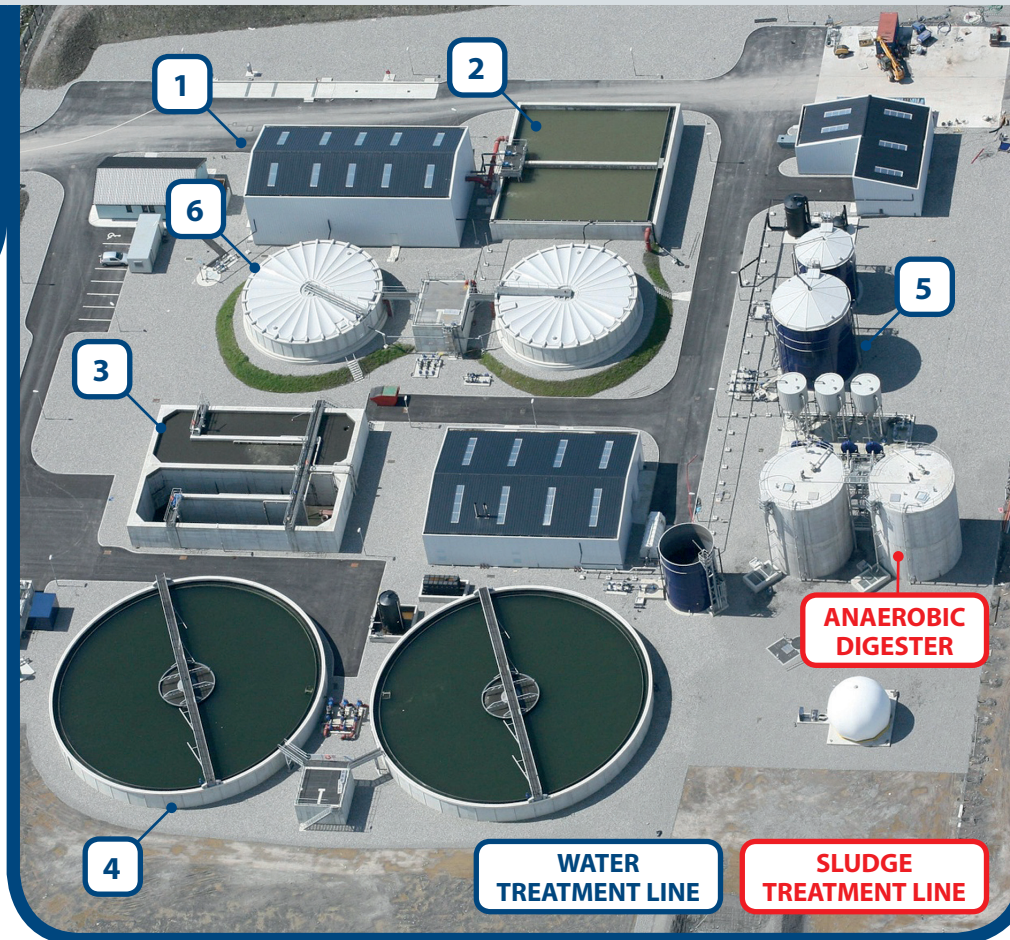


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1. Application Description

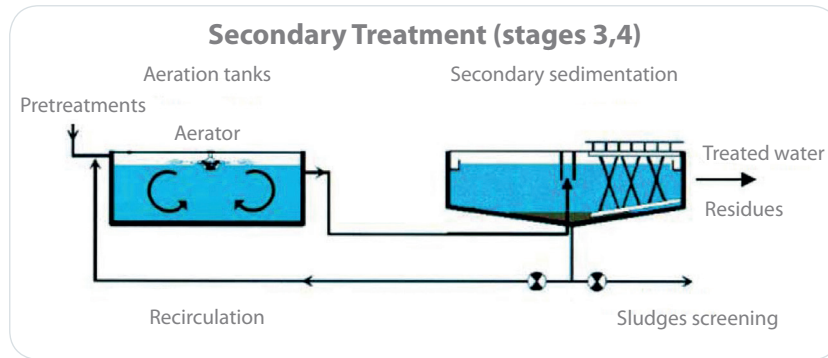
Wastewater treatment plant

Wastewater treatment is the process of removing organic and inorganic contaminants from wastewater and household sewage, both effluents and domestic. It includes physical, chemical and biological processes, to remove the different types of contaminants. Its objective is to produce a treated effluent from which are removed all the particles, sediment and organic materials.

In a wastewater treatment plant there are usually two specific lines dedicated to the water and to the sludge treatment.

THE WATER TREATMENT LINE is usually composed by the following stages:

- Preliminary treatment (1): it's used to remove the organic substances part contained in the sewage. It includes *Screening* (the influent sewage water is screened to remove all large objects carried in the sewage stream), *Fat and grease removal* (fat and grease is removed by passing through a small tank where skimmers collect fat floating on the surface), *Grit/sand removal* (grit, sand and stones removal from treated water).
- Primary treatment (2): it includes the *Primary sedimentation* (removal of solid organic and inorganic) and *Skimming* (removal of the grease and oil rise from the surface).
- Secondary treatment (3,4): it is composed by the **Aeration process**, where the aerobic oxidation removes the organic matter, and the *Secondary sedimentation* to evacuate sludge produced in the previous process.



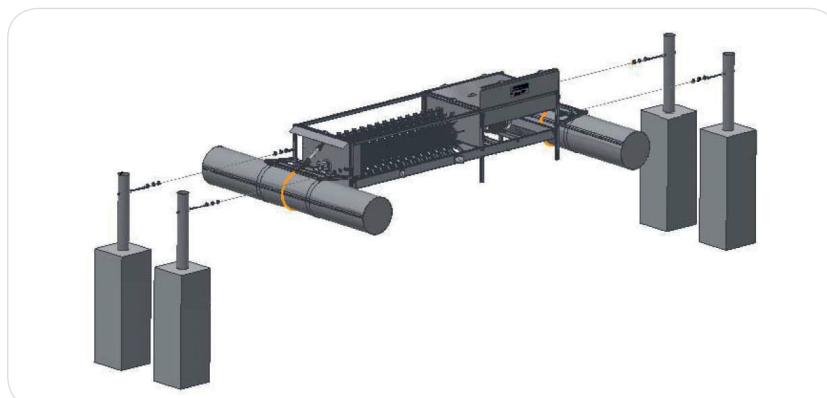
- Tertiary treatment (5,6): it's made on the output from the secondary sedimentation and it allows to obtain a further refinement of the purification degree. It includes *Denitrification* (it refers to the process of removing the nitrogen from the treatment facility discharge, through a combination of chemical additives and bacterial degradation), *Phosphorus removal* (the phosphorus is biologically removed from the treated water), *Disinfection* (it's composed by Chlorination and Ozonization).

The sludges accumulated in the wastewater treatment process are treated in **THE SLUDGE TREATMENT LINE** in a safe and effective manner. The purpose of digestion is to reduce the amount of organic matter and the number of disease-causing microorganisms present in the solids. The most common treatment options include:

- *Digestion*: it is a bacterial process, during which microorganisms decompose the organic matter under anaerobic conditions. This process takes place inside double stage Anaerobic Digester, where material is being continuously mixed by agitator avoiding the material sedimentation at the bottom of the tank and producing biogases (for example Methane) which can be used in generators for electricity production.
- *Dewatering*: elimination of water from the solid or the sludge, before disposal and/or recycling, through natural or mechanical process.

2. Example of Motovario solution

As far as all wastewater treatment processes are concerned, Motovario is the supplier in the **aeration process** for the drives unit of the surface aerators which are present in the water treatment basins. The machine's floatation is ensured by two floaters that are anchored by ropes to four pillars to provide stability.



Industrial Sector: Chemical industry

Application: Wastewater Treatment Plant

With this type of machines there aren't dead zone at the bottom of the tank where fluid wouldn't receive the oxygen necessary to maintain the concentration in the fixed range. Only a little part of these brushes is immersed in the water, because it is necessary to optimize the ratio aeration / installed power. Increasing the length immersed in the fluid, the water aeration increases but also the absorbed power increases.



In this type of machine are used **helical bevel gear reducers** characterized by the following features:

- Ratio: 22
- Output torque: 3500 Nm
- Motor power: 18 kW.

The helical bevel gear reducers also ensure:

- Capacity of thermal dissipation: it possible to use this type of reducers where ambient temperatures and daily thermal excursion are high (i.e. Countries like Iraq or Turkey).
- Double output shaft: in some cases it allows to connect two different machines to the same reducer.

