64%

of people have access to clean drinking water worldwide today.

80%

of all wastewater flows back into the planet's ecosystem untreated[2].

Ensuring proper treatment for wastewater is one of the top priorities for the future of humanity. Yet the issue is complicated by the fact that the diversity of pollutants found in wastewater is increasing: nitrates from fertilizers, nanoparticles from plastics, and micropollutants (drug residues, cosmetics, etc.) are increasingly present.

Wastewater treatment today: How does it work?

The waste water treatment process usually involves five steps.

01
Primary treatment

This step involves removing easily collectible and filterable materials (fats, oils, greases, sand, gravelstones, etc.). The clarifier basin, further on in the process, then allows the elimination of the majority of non-soluble particles.

02
Biological treatment

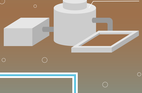
In the so-called aerated basin, used water is put in contact with the micro-organisms (activated sludge). **This basin needs a supply of oxygen to function properly.**

03
Secondary treatment

The clarifier basin enables the sludge to be separated from the clean water. This step allows for the sludge to be recovered before clean water is discharged into the environment.

04
Elimination of sludge

In parallel with the wastewater treatment, the used sludge must be evacuated. It is first thickened, then dehydrated and dried before being discharged.



05
Finish

This step consists of removing low concentration residues which are not biodegradable.

The key role of oxygen in metabolizing biological matter

During step 2 of the water treatment process, the micro-organisms that are used need oxygen to breathe and to metabolize biological matter. Today, most sites inject air into their biological basins.

So replacing air (composed of only 21% oxygen) with pure oxygen increases the effectiveness of the basins and their treatment capacity is boosted by up to 50%. No need to expand basins or build new ones, thus limiting capital expenditure. What is more, foam on the surface of the water in treatment basins, generated by chemicals and air flow, is reduced and unpleasant odors caused by insufficient oxygen are eliminated.

Oxygen is stored in liquid form and then, after a passage through a vaporizer, injected in gaseous form.

Innovative solutions

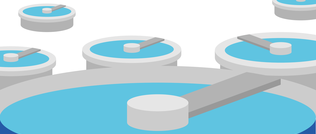
Air Liquide supports its customers by developing innovative solutions for increasing the amount of oxygen in their aerated basins. Air Liquide's customers can share data on their gas injection systems, temperatures and oxygen concentration in biological treatment basins, and the amount of waste products in water as it enters and leaves the plant. This allows Air Liquide to analyse site performance and raise alerts if the computed statistics indicate the presence of a malfunction.

more than

1500

references worldwide

at both industrial water treatment sites and municipal sewage works



Thanks to its know-how and technologies, Air Liquide is helping industries and municipalities rise to the challenge.

[2] Water Quality and Wastewater on unwater.org (2017, Unesco).