Biological wastewater treatment

Today, water quality is largely controlled by statutory regulations. Biological treatment of wastewater plays a crucial role here. Which is why we at Linde have been systematically improving our oxygen-based wastewater purification processes.

Cleaning wastewater with oxygen

In EU countries, treatment of industrial wastewater is on the whole strictly regulated, especially when the water in question is being returned directly to the environment. Temperature, pH value and the degree of contamination are all subject to control. Figures relating to chemical and biochemical oxygen demand provide information on the amount of organic substances in wastewater as they reveal how much oxygen is required to break down organic matter.

Mechanical/physical, biological and chemical processes are all used to treat wastewater, which is why modern treatment plants function on a three-tier principle, with each stage focusing on a different treatment process.

Part of the biological phase involves microorganisms degrading any biological contaminants still present in the wastewater. If the water contains too many contaminants, however, the process may break down and the water will start to smell. This is caused by insufficient oxygen supply to the microorganisms degrading the pollutants in the wastewater. Once this occurs, the water can no longer be properly cleaned. Yet the situation can be avoided by artificially adding oxygen.

Injecting oxygen in this way can quickly raise performance and efficiency levels in treatment plants, often eliminating the need for time-consuming and costly expansion.

Oxygen injection systems from Linde have therefore played an important role in wastewater treatment for many years now. And we are committed to continually developing our processes in order to streamline these cleaning processes through more efficient use of oxygen.

Specialists in oxygenation technology

A number of factors are crucial to ensuring that oxygen in treatment plants is used as efficiently as possible. Oxygen-rich and oxygen-deficient water, for example, must be distributed evenly and the wastewater effectively circulated. Controllable, in other words, flexible oxygen injection systems are also key to maximising plant efficiency. And Linde not only supplies the oxygen, but also the necessary equipment such as nozzles and perforated diffuser hoses. These are fixed to the bottom of a wastewater tank and release oxygen into the water.

Linde also specialises in feeding oxygen into pressure pipes. If the natural gradient of the pipes is too low, the wastewater has to be pumped to the treatment plant. Due to bacterial activity, oxygen in the pipes is consumed very quickly and the wastewater starts to decay if it is allowed to stagnate in pipes for too long. These conditions promote the generation of hydrogen sulphide (H_2S), a toxic, foul-smelling gas, which can be used by certain bacteria in damp conditions to produce sulphuric acid (H_2SO_4). This can lead to pipe corrosion. The problem can be resolved by injecting sufficient amounts of pure oxygen into the wastewater – a solution that is not only kind to the environment, but also inexpensive to purchase and operate.