

INCREASED ENERGY EFFICIENCY THANKS TO THE MODERNISATION WITH AERZEN TURBO.

Turbo blower made by Aerzen modernised treatment plant in Emsbüren.

Wasserverband Lingener Land has four wastewater treatment plants in the towns Lengerich, Freren, Spelle and Emsbüren. About 35,000 citizens in nearly 12,000 households are connected. With a capacity of 16,000 population equivalents, Emsbüren wastewater treatment plant is the biggest and, in the course of a modernisation, it was equipped with a turbo blower made by AERZEN. The compact unit supplies the aeration tank cyclically with oxygen for the oxidation of ammonium to nitrate. This had been preceded in 2015 by the equipment of the basin with its depth of six metres with modern fine-bubble difusers made in Austria. According to the estimation of Hermann Schräer, local skilled worker, the energy savings of the wastewater treatment plant of 30 per cent - referred to the overall operation - are mainly to be put down to the new aeration concept.

Modernisation with great effectiveness.

“In the purification, we are now working so productively that we could take one of our two aeration tanks out of operation.” And this increase of effectiveness directly improves the resource efficiency - for example, as now only one submersible mixer must work, and no longer two.

The AERZEN turbo blower TB 50-0.8S, with its electrical motor power of 42 kW and a maximum speed of 42,000 rpm, supplies a volume flow of up to 2,000 cubic metres per hour. The turbo blower installed beside the aeration basin in a compact building has to reach in its performance class a differential pressure of up to 800 millibar. This value is sufficient as the maximum back pressure at the ground of the biology, with a water depth of six metres, is 600 millimetres. As the air supply is arranged only a few metres away from the basin the efficiency increases once again. Shorter pipings reduce the friction losses, thus arranging for a lower flow resistance in the system.

Energetically optimised turbo.

The cyclic reduction of the nitrogen bound in ammonium and nitrate compounds makes it necessary that aerated and non-aerated phases alternate as far as the time is concerned. At



Segment	Environmental engineering
Problem	High energy consumptions due to overaged equipment
Solution	Aerzen Turbo
Result	Increase of resources and energy efficiency
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present, the daily operation comprises nine aeration cycles. The capacity of the AERZEN turbo blower is controlled within the redox curve via the current actual value of the oxygen saturation in the water. "For the nitrification phase an oxygen concentration of 2 mg/l has proved to be successful. If this value has been achieved the PLC reduces the capacity of the turbo," explains Hermann Schräer. If the wastewater plant blew in more air and increased the oxygen concentration to about 3 mg/l, on the one hand this would mean wasted money and on the other hand the time for the anaerobic nitrate removal would extend. In General, for Emsbüren applies that the wastewater treatment plant must observe a COD value of 70 mg/l, but the average value is 40 mg/l. Therefore, Schräer assesses the available technology as "very good solution, in particular for small wastewater treatment plants."

During an aeration cycle, first of all the turbo blower starts for some minutes with a capacity of 100 per cent, to set the wastewater in the basin in motion. For the remaining time, the unit runs energetically optimised with about 60 per cent of the maximum capacity. At present, the time span of the aerobic and anaerobic phases is fixed to approximately two hours. During the night, and with less inflow, longer periods apply and the considerably lower air requirement is covered by a small positive displacement blower.



AERZEN. Compression as success principle.

AERZEN was founded in 1864 as Aerzener Maschinenfabrik. In 1868 we built Europe's first rotary lobe blower. The first Turbo compressors followed in 1911, the first screw compressor in 1943, and in 2010 the world's first rotary lobe compressor unit. Innovations "made by AERZEN" keep driving the development of compressor technology. Today, AERZEN is among the world's oldest and most significant manufacturers of rotary lobe blowers, rotary lobe compressors, rotary lobe meters, screw

At Wasserverband Lingener Land, the turbo blower is the heart of the biology "and is running very well," says the skilled worker. In comparison with the replaced technology with a turbo blower of an older year of construction, the operation is extremely safe and energy efficient. The AERZEN Turbo type TB 50-0.8S starts with a power of 42 kW and then turns down to 23 kW. As energy efficiency always means the correct design for the necessary air requirement the blower capacity has been designed exactly for this basin. The old blower, manufactured in 2001, had been dimensioned generously and had a connection capacity of more than 70 kW - too much for the aeration system of 2,500 cubic metres and its basin with a depth of six metres and a diameter of 24 metres.

The wastewater treatment plant of Wasserverband Linger Land shows the energetic advantage offered by turbo blowers even in relatively small biological basins. Moreover, the robust construction of the AERZEN TB-series makes it possible to leave the otherwise usual continuous operation and to operate the turbo cyclically instead. Thus, this procedure forms the basis for a simple and effective modernisation of small municipal wastewater treatment plants in the countryside. At Wasserverband Lingener Land they are already planning the next projects.



compressors, and Turbo blowers. And among the undisputed market leaders in many areas of applications.

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