

Efficient Rotary Screw Blowers & Optimised Aeration Reduce Electricity Consumption



As part of a major modernisation of Germany's Hirblingen sewage treatment plant, six HPC KAESER rotary screw blowers were installed to take care of aeration of the activated sludge tanks. Energy consumption was significantly reduced as a result.

The most important employees at the mechanical-biological sewage treatment plant in Hirblingen are small. Even so small that they cannot be seen with the naked eye. We're talking about microorganisms. They work around the clock in the aeration tanks to clean the domestic and commercial wastewater generated in the association area.

But in order for this to succeed, compressed air in the form of fine bubbles is introduced into the mechanically pre-cleaned water in the aeration tank. The bacteria and microorganisms contained in activated sludge need oxygen in order to break down the organic pollutants in the wastewater.



In addition, the microorganisms bind the fine contaminants into sludge flakes, which are separated in the subsequent clarification process.



Given the energy-intensive production of compressed air, the aeration tanks account for between 24 and 30% of the energy requirements of a sewage treatment plant. The energy efficiency of sewage treatment plants depends largely on the design of the aeration tanks and their aeration system. A fact that the Schmuttortal wastewater association did not ignore during the renovation in Hirblingen.

“In recent years, several optimization measures have been carried out on the wastewater treatment plant site,” explains Martin Schwab, operations manager of the Hirblingen wastewater treatment plant. “In addition to the construction of a third secondary clarification tank and the construction of a second stormwater overflow tank, the main focus was on upgrading the aeration



systems in the existing aeration tanks. The old blowers had been in operation for over 30 years. For energy reasons these had to be replaced.”

Exceptional energy savings

Six HPC KAESER EBS 410 L SFC screw blowers with 45 kW motors for 650 mbar are now doing their work on the aeration tanks. In addition to the high energy efficiency, the wide control range was also the deciding factor in choosing HPC KAESER.

“In many sewage treatment plants, the compressed air required is generated using inefficient blowers, which have high potential for optimization and therefore electricity savings,” explains Peter Werhahn, blower product manager at KAESER Compressors.

“Our screw blowers are highly efficient across a wide volume flow range. The excellent efficiency enables savings of up to 35% compared to conventional blowers.”

In addition to switching to more efficient systems, their control and design are also important for the energy efficiency of the sewage treatment plant. All HPC KAESER screw blowers have the integrated SIGMA CONTROL 2 control. This stands for efficient control and monitoring of operating and status data - in real time. By continuously recording the operating parameters, comprehensive monitoring of the systems can be achieved. This reliably prevents downtime.





Efficiency that pays off

The EBS screw blowers were equipped with a frequency converter. This ensures a variable adjustment of the volume flow to the needs of the process using speed control. This saves additional electricity and therefore money.

Furthermore, the type of air introduced into the aeration tank has a significant influence on efficiency. One reason why the old candle aerators were replaced by plate aerators during the general renovation.

The fine-bubble pressure aerator is attached to the bottom of the pool and distributes the compressed air as fine bubbles across a wide area of the pool. This increases the oxygen input per kilowatt hour of electricity and, as a result, reduces electricity consumption by a further 10 to 30%, depending on the system.

Thanks to the previously predicted energy savings of up to 45% for the entire system, the renovation project was able to be implemented with funding: For the renewal of the aeration system for the aeration tanks, the Schmuttetal wastewater association received a funding notice

from the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety for around 30% of the amount.

“The renovation is a sustainable step towards the future,” emphasizes operations manager Martin Schwab. “With the screw blowers from KAESER, we are now optimally positioned in terms of performance and energy savings.”

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