



AERZEN COM•PRESS

AERsmart
Highest efficiency in
aeration tanks

2



Biogas applications
Made by AERZEN

3



WWTP Filderstadt
Every kilowatt utilised optimally

4



Dear Readers,



Stephan Brand,
International
Marketing Man-
ager/Director
Turbo Business

The subject of energy efficiency moves the world, and the world needs energy efficiency! In view of the above, you'll find in this edition of COM.PRESS the new AERZEN solutions for maximum energy saving potential.

We're pleased to be able to introduce to you the new AERsmart machine control system, which aligns blower efficiency and load profiles in wastewater treatment plants. With this new technology, savings of up to 15% are possible.

Furthermore, we'd like to introduce to you new options in the fields of heat recovery and biogas treatment. Several case studies will give you a first impression of the potentials and the solutions.

And what moves you? Let's talk about it, perhaps at one of the forthcoming trade fairs. Make use of our know-how; we're pleased to be of service to you!

Stephan Brand



With a combination of Aerzen turbo blower, Delta Hybrid and Delta Blower the air for the aeration tanks at the wastewater treatment plant in Rheda-Wiedenbrück is generated exactly as needed and in the most energy-efficient way.

AERZEN is helping a WWTP to reduce its energy usage

Intelligent air supply for wastewater treatment plants

The wastewater treatment plant at Rheda-Wiedenbrück is currently testing a brandnew control concept for AERZEN blower technology - the AERsmart control combination.

Modernisation work at the wastewater plant began in 2013. The citizens of the Rheda-Wiedenbrück region, as well as Germany's largest pig slaughterhouse, are connected to this plant. A project objective was to supply the biological purification process more efficiently with air, by not only replacing old ventilation grids with new ones, but also by installing these 30 cm. deeper into the ground at the aeration basins. "In view of the surface area of the six basins, we could increase our processing volume by several hundred cubic metres," explains wastewater manager Hendrik Wulfhorst. Subsequently, however, 30 cm. of space gained resulted in an increase in the system pressure of 30 mbar, which had to be factored in accordingly in the design of the blower technology.

Needs-oriented control system

Before the modernisation of the plant, the biology had been run with a rather high

excess of oxygen in the basins, mainly to cover safely any fluctuations in the entry values of the slaughterhouse. With the order to reduce operating costs and the associated CO₂-emissions, a clear objective of the project was to link the aeration of the basins considerably more closely with the fluctuating waste water load and the resulting oxygen consumption. This implied, as a first step, a requirement for needs-oriented speed control of the four blower units made by AERZEN.

The setpoint values are generated by the Programmable Logic Controller (PLC) from the data measured in the waste water - mainly in the form of ammonium and nitrate concentrations. In addition, there is an intelligent control system for the diaphragm regulating valves. They close slowly, when the required oxygen saturation in the water of the corresponding basin has been achieved. To avoid their closure leading to a higher pres-



Markus Haverkamp,
project engineer aquaconsult

Thanks to AERsmart and a slide pressure control the different AERZEN machines in combination always run at their overall optimal level.

sure - and consequently resistance - in the pipe, in parallel the PLC reduces the target pressure. "Otherwise we would destroy energy by means of the diaphragm regulating valves, as within a constant pressure regulation the blowers have to work against the pressure loss caused by the diaphragm regulating valves," explains Markus Haverkamp, project engineer from the supporting planning company aquaconsult. For the base load supply of the biology, providing alternately a circuit of ventilated and unventilated basins with three purification stages, the engineering office in Hanover came up a solution, with the planning and realisation involving, among others, a turbo blower made by AERZEN.

Turbo blower for the base load

The type AT 150-0.85-G5 achieves an intake volume flow of 4,800 cu-



Aerzen Asia at Asia Water 2016



Chuck Lim, Managing Director Aerzen Asia, at this year's Asia Water trade fair

Supported by its local distributor, Solidium, Aerzen Asia participated from 6th to 8th April in Asia Water 2016 in Kuala Lumpur, Malaysia. This is the biggest industrial trade fair in the region for water and waste water. Aerzen Asia received a great response from many important visitors, including decision-makers in governmental and industrial water management, with the concept Performance³, including Turbo, Hybrid and Blower. Paving the way for further progress, Aerzen Asia was awarded the SPAN certificate by the National Water Services Commission Malaysia last year. This certification is a prerequisite for all blowers used in Western Malaysia's wastewater treatment plants.

AERselect – new on the Customer Net

With the introduction of AERselect, AERZEN has made the Customer Net even more user-friendly. AERselect is a tool that has been designed especially to meet the demands of engineering offices, system manufacturers and end users. AERselect, which is based on MS Excel, is a helpful support tool for making various calculations, such as acoustic calculations or calculations of pressure loss, room ventilation and dew point. With a few clicks, users can create a tailored service specification which will be provided in the form of an editable text file, which can easily be integrated into tender documents. The new planning tool is available at: www.aerzener.de/customer.net.

New Embedded Webserver modules

AERZEN has introduced an extension for its proven communication-capable control system AERtronic: Thanks to the new module, Embedded Webserver, operating data is available and can be read at any time, and from anywhere in the world, by means of an HTML5-capable web browser. An intuitive operating concept, as well as a user-friendly interface, quickly provides information about the most important measured values of packaged units, such as pressure, temperature, operating hours and service hours. All process data is safely stored on an SD card integrated in the webserver module. Possible malfunctions can be detected, and remedied, as quickly as possible, and maintenance assignments can be scheduled at an early stage. Operational interruptions will therefore be reduced significantly.

AERZEN offers an extension for the control system AERtronic with the new Embedded Webserver module.



> bic metres per hour with a motor nominal power of 143 kW at an intake pressure of 1 bar and a final pressure of up to 1.8 bar. For Cord Utermann, sales engineer at AERZEN, turbo blowers are classic examples of energy-optimised base load machines which should run permanently for 24 hours a day within nominal value parameters, as then they operate at the highest economic efficiency. "As with almost any turbo technology, energy efficiency falls as soon as the machines are driven into the partial-load range," explains Utermann. As a consequence, concepts are to be developed for cleaning the varying dirt loads equally energy-efficiently during the day. For optimal energy efficiency in a wastewater treatment plant, the air requirement exceeding the base load has to be covered by displacement machines like positive displacement blowers and rotary lobe compressors. They are strong in high control ranges between 25% and 100%, and have good efficiency, even in part-load operation. Therefore, two AERZEN packaged units type Delta Hybrid (D 62 S) and one Delta Blower (GM 80 L) are also part of the compound system in the wastewater treatment plant in Rheda-Wiedenbrück.

AERZEN has developed AERsmart in order to ensure that this quartet not only covers the necessary oxygen for the aeration tanks by a safe process, but also generates the required air volume in the most energy-efficient way in the compound system. According to Utermann, "the high art of control engineering is to make transitions between the overlaying operating areas as fluent as possible and as energy-efficient as possible for every load." Since three different machines with diverging operational ranges and efficiencies

are applied in the wastewater treatment plant in Rheda-Wiedenbrück, their operation must be co-ordinated in such a way "that the number of switching operations is kept as low as possible, as permanent switching-on and off increases wear," according to Haverkamp. "Efficient air distribution among the aeration tanks and efficient machine selection are necessary for optimal overall efficiency," he adds.

AERsmart makes it possible

The demand for oxygen in the three clearance stages is the basis for the optimisation of the control system with the AERsmart control. The indices are processed by the central PLC of the plant and the resulting target pressure is transferred by Profibus to the blower control. AERsmart then takes care of the optimally combined operation of the four packaged units in relation to energy saving. "The turbo blower used here has, for example, the highest efficiency at a capacity of 83 per cent," explains Utermann. If the air requirement is beyond this value, it can be more efficient to switch-off the base load machine completely and to cover the relatively low air requirement with both Delta Hybrid machines. "Our bacteria do not care where

the oxygen comes from," says Wulfhorst with a smile. But the manager of the wastewater treatment plant points out that the blower technology was projected in the run-up to the modernisation so that the performance of the turbo blower should be sufficient for the "normal" daily requirement.

As an interim result, the wastewater treatment plant in Rheda-Wiedenbrück is saving about 30 per cent energy in the biology with the energy-optimised blowers, and a relatively simple process control which is more closely linked to the prevailing actual values. AERsmart provides a further five to eight per cent reduction in energy usage. The field test in the wastewater treatment plant will prove how much the savings will be over a longer operating period. Rheda-Wiedenbrück is the first wastewater plant in Germany to test the AERsmart system under real conditions. "We can only see the complex connections of a wastewater treatment plant in the field. They cannot be displayed on a test bench. This is why intensive co-operation with our customers is so important. Only this can provide us with a close application reference for future-oriented developments," summarises Utermann. ○

Markus Haverkamp, Cord Utermann and Hendrik Wulfhorst are satisfied with the results of the field test.



With diaphragm regulating valves and modified speed the air introduction into the tanks is controlled.



Higher efficiency with AERsmart

Even better performance in the aeration tank

Until now, the combination of AERZEN blower, turbo and hybrid technology has offered the most efficient solution for the air supply of aeration tanks in a wastewater treatment plant. With AERsmart, the new control combination from AERZEN, performance can now be sustainably increased even further.

The load operation in organic wastewater treatment plants is subject to considerable fluctuations. With its high-performance compressors Delta Blower, Delta Hybrid and AerzenTurbo, AERZEN offers an impressive portfolio for the oil-free oxygen supply of aeration tanks in this field of application. The advantages of using the three technologies

within a combined system are these: highest energy saving, best control range and lowest investment costs.

The machine control system, AERsmart, is now the new intelligent component. Volume flows are carefully monitored so that low, medium and high loads can be processed in the most efficient way, with ideal performance scenarios integrated into the algorithm of the control system. Consequently, the installed machinery is able to operate at very close to the theoretical highest level of efficiency. AERsmart can provide the highest efficiency through the perfect interplay of up to twelve machines, including third-party products.

AERsmart is the first master machine control system which can efficiently combine different machine technologies. Furthermore, unit data including pressure, volume flow, temperatures, energy consumption and fluctuating loads, as well as the machine data including service intervals, can be recorded and transferred to

the control centre for further processing. So, changing requirements and possible ageing effects of the aeration system can constantly be monitored.

Finally, AERsmart also convinces because it operates fully in line with new guidelines from the DWA guidelines (German Association for Water Economy, Waste Water and Waste) for the energy efficiency and energy analysis of wastewater treatment plants. And besides, as an intelligent interface, it is already pointing the way to Water 4.0. ○

AERsmart, the new control combination made by AERZEN



Premium technologies for the biogas industry - made by AERZEN

“Expect a lot!”

The use of biogas for energy generation will help considerably when it comes to achieving the objectives set out, both nationally and internationally, in nuclear energy programmes and for the reduction of CO₂ emissions. AERZEN COM.PRESS interviewed Axel Cichon, Head of Business Unit biogas, about what customers in the biogas industry can expect from AERZEN.

Mr. Cichon, what is the role of biogas/biomethane today in the generation of energy?

Cichon: To be able to reply to this question correctly, it is important for me to clarify the two terms, as both gas types have, and will continue to have, a different meaning, and importance, for energy supply: Biomethane is processed biogas - after processing, it has natural gas quality, so it may be fed into natural gas systems. Whereas from biogas itself, power can be generated directly, at block-type thermal power stations. This is then fed into the power system. So, we are talking about two different uses.



Axel Cichon,
Head of Business Unit biogas at AERZEN

Our strengths with regard to biogas technology are our experience gained over decades, our international positioning and a complete product portfolio.

What worldwide trends do you see in the field of biogas/biomethane?

Cichon: Currently, in Europe, there are about 16,000 biogas plants generating power out of biogas, but only about 350 plants processing biogas into biomethane, which is then fed into the gas system. According to EU targets (please refer to www.greengasgrids.eu), this situation will change significantly by the year 2030: The number of plants converting biogas into electricity is likely to remain fairly stable, while the number of biomethane plants is set to increase to several thousand. Even if you consider these figures to be very optimistic, you can clearly see the direction of travel. In the process of converting biogas into electricity, our blowers are not often used, due to the low pressure required, but when it comes to producing biomethane, we see significant market potential for our products in the near future.

Which products or technologies does AERZEN offer for biogas and for the processing of biogas into biomethane?

Cichon: Our strength is that we can offer suitable blower and compressor packaged units for nearly all processes. No matter whether a discharge pressure of a few hundred millibars or 20 bar is required: We have a suitable solution for our customers. In addition, we can measure, with our gas meters, the biogas/biomethane generated. Furthermore, we can offer local service worldwide via our 43 AERZEN subsidiaries. So, we are well ahead of our competition.

Which products are currently in particular demand?

Cichon: At present we are experiencing increasing demand for our oil-injected compressors for compression of biogas in treatment processes. Another satisfactory development is that we are seeing a change in the market, and with our customers, towards using high-quality, reliable products, complying with all safety standards. Meeting such requirements comes as standard for our products, but

this is not the case with low-price products, which have high susceptibility to failure. The extra price to be paid for our products pays off very quickly, due to the long service intervals and resulting high availability of the plant the keyword is: Life Cycle Cost Analysis.

For how long has AERZEN been working on biogas applications?

Cichon: For us, the compression of biogas is nothing extraordinary, special or new. In our opinion, biogas is a type of process gas. And, in turn, compression of process gases has been a core competence of AERZEN for decades. So, in all our products for the biogas market, our extensive know-how of development, manufacturing and application of twin-shaft rotary lobe compressors gained over 150 years can be found. Based on this knowledge, and this experience, we always offer our customers the optimal and most economical solution for their application. ○



AERZEN
VMX 110 compressor
for compression of biomethane

www.aerzen.com

Always well-informed, and now mobile as well

AERZEN's corporate websites are being upgraded: Since May 2016, www.aerzen.com has been online with a lot of new content and functionality. Upgrades will take place to the websites of all AERZEN subsidiaries worldwide over the course of 2016.

The new AERZEN website impresses with a high degree of transparency, user friendliness and service capability, which exactly represents the image AERZEN stands for as company. Besides the comprehensive 'facelift' of the website interface, the technical foundations have been completely updated as well. Visitors to the website will benefit from the following:

Learn many new details under www.aerzen.com



Responsive Design

The AERZEN website is automatically optimised for laptops, tablets and smartphones, providing unlimited access to navigation, pictorial elements and text anywhere and at any time.

Product search and product view

Visitors can find individual product solutions with just a few clicks of the mouse. Technical details, specific documents, image libraries and 360 degree views give detailed information on AERZEN products and services. Individual accessories and modifications will shortly be assigned to each product and displayed accordingly.

Scope

More industrial sectors are being added. For the core areas, including water and wastewater treatment, pneumatics,

chemical and process engineering, biogas, vacuum, compressed air etc., AERZEN provides detailed information, application reports, white papers, brochures, videos and links to applicable product solutions. Further sectors, including steelworks, the maritime economy and power plants are already planned.

Service

The area for After Sales has been redesigned and is now more clearly laid out. Visitors can now access the requested services more quickly, or may apply for the required services by using a request form. Company, News, Career

The Company, News and Career pages have also been redesigned and are now more clearly laid out. Contact lists are now presented in the form of business cards; media and AERZEN COM.PRESS articles can be recommended and shared using social media buttons.

CustomerNet

The authorisation groups of registered CustomerNet users will remain:

- New Members (access to "General Information")

- Members (access to product-specific information: catalogues and operating manuals)
- Premium Members (access to web configurator)

The structure, however, is new: In future, product categories will be displayed and different documents such as product catalogues, operating manuals, certificates etc. will be assigned to the individual products and will be made available. This means that all documents relating to the requested product will be found on one page.

Simultaneously with the go live of the new website, all registered CustomerNet customers worldwide will receive an e-mail with a request to assign a new password, as existing passwords cannot be transferred to the new AERZEN content management system.

AERZEN Worldwide

With just a few mouse clicks visitors can reach the requested country website or can directly locate the contact address of the requested subsidiary. ○

Exhibition dates

In the next six months, AERZEN will participate in the following fairs and trade exhibitions:

SSIWW , Singapore	11th until 13th July 2016
FENASAN , Sao Paulo/Brazil	16th until 18th August 2016
ACODAL , Cartagena/Colombia	21st until 24th August 2016
SMM , Hamburg/Germany	6th until 9th September 2016
EXPOMINA , Lima/Peru	7th until 10th September 2016
COM-VAC Show , Chicago/U.S.A.	12th until 17th September 2016
Electra Mining , Johannesburg/South Africa	12th until 16th September 2016
Turbo Show , Houston/U.S.A.	15th until 17th September 2016
FIB , Bogotá/Colombia	26th until 30th September 2016
IMA , Hamelin/Germany	24th September 2016
Weftec , New Orleans/U.S.A.	26th until 30th September 2016
VA Mässan , Jönköping/Sweden	27th until 29th September 2016
Industrial Processing , Utrecht/ Netherlands	4th until 7th October 2016
KIOGE , Almaty/Kazakhstan	5th until 7th October 2016
AllPack , Jakarta/Indonesia	5th until 8th October 2016
TNAV-Aquarama Event , Leuven/Belgium	12th October 2016
Powder & Bulk Solids , Mumbai/India	13th until 15th October 2016
Wasma , Moscow/Russia	18th until 20th October 2016
Solids , Antwerp/Belgium	19th/20th October 2016
Maintain , Munich/Germany	19th/20th October 2016
K , Düsseldorf/Germany	19th until 26th October 2016
PVCexpo , Moscow/Russia	25th until 27th October 2016
Vietwater , Ho-Chi-Minh City/Vietnam	9th until 11th November 2016
Biogas ConfE , Hanover/Germany	15th until 17th November 2016
Pollutec , Lyon/France	29th November until 2nd December 2016

IMPRINT

AERZEN COM•PRESS

Customer journal of
Aerzener Maschinenfabrik GmbH
Edition 2 • 2016

Editor

Aerzener Maschinenfabrik GmbH
Reherweg 28
31855 Aerzen GERMANY

Editorial staff

M/Stephan Brand (v.i.S.d.P.), Sebastian Meißler,
Frank Glöckner, Klaus Grote, Klaus Heller, Pierre Noack

Picture credits

Aerzener Maschinenfabrik, Aerzen Asia,
Shutterstock

Realisation

Maerken Kommunikation GmbH
Von-der-Wettern-Straße 25
51149 Cologne
Number of copies: 5.500



Four Delta Hybrid units made by AERZEN, arranged for maximum energy efficiency, and supplying microorganisms with oxygen.



Wastewater treatment plant Filderstadt-Bonlanden relies on AERZEN's energy-efficient blower technology.

Heat recovery with AERZEN blowers

Every kilowatt utilised optimally

As a part of an extensive renovation project, the city of Filderstadt modernised the Bombach wastewater treatment plant, located in the district of Bonlanden. Now, Delta Hybrid rotary lobe compressors made by AERZEN provide optimal oxygen supply, and, thanks to heat recovery measures, the energy balance has improved further.

Although nowadays process control engineering is getting more and more sophisticated, the biological processes at a wastewater treatment plant cannot easily be transferred to other plants, as "the microorganisms are very sensitive to changes," explains Sven Gayring, deputy works manager in Filderstadt-Bonlanden. And, while process control engineering is becoming more and more important, simultaneously the demands for efficiency are increasing.

Generate blower air more economically

The technology at the Bombach wastewater treatment plant was no longer up-to-date. During its fundamental modernisation, a particular focus was on biology, which accounts for the lion's share of energy costs, mainly due to the blowers maintaining the oxygen supply for the microorganisms.

For this, the city of Filderstadt now uses the four packaged units type Delta Hybrid (D 24

S, 1005 m³/h, 30 kW) made by AERZEN. The packaged unit technology combines the advantages of blower technology and compressor technology, and is not only energy saving but also one hundred percent process safe, as the packaged units provide absolutely oil and absorption material-free air. This means that the packaged units work at optimal levels of energy efficiency both in cases of low air requirement and under higher loads.

Increased efficiency through optimised processes

To be able to control the volume flow for the basins precisely, all four Delta Hybrid machines are speed-controlled in a frequency range of between 21 and 50 hertz. With a motor power rate of 30 kW each, the units have been spatially combined in one building, but their blower capacity, with a maximum discharge pressure of 1.6 bar (abs.), is split: One packaged unit takes over the basic supply of biology 1, while the other three supply the newly-built aeration basin. Having installed the four rotary lobe compressors in a single room, the wastewater treatment plant has the option to use the radiant heat from the units in a quite simple way. An extraction system installed in the room collects the heated air and distributes it to other rooms in the technology area.

There is even greater potential for heat recovery from the blower air itself. This results from the increase in air temperature during compression. To make use of this potential for better energy efficiency, a pipe bundle heat exchanger has been installed in the main pipe. Water, withdrawing a tempera-

ture difference of up to 17°C from the warm air, flows through this heat exchanger. The potential, with a flow capacity of 20 cubic metres per minute each, is for an estimated thermal output of 14 kW. This capacity is primarily used for the generation of hot water and for heating the newly built operations building. "Heat recovery in wastewater treatment plants is becoming a more and more important subject," says works manager Martin May. "It is important to utilise all sources of energy as effectively as possible."

Only as much air as is required

In the new biology 2, the microorganisms quite specifically decompose nitrate in anaerobic environments. If a sufficient volume of oxygen is available, their preference is to consume ammonium compounds. To be able to control these two degradation processes in one basin, the air supply has been divided into zones. The oxygen content can be controlled precisely according to the prevailing nitrate and ammonium concentrations via the speed of the Delta Hybrid machines made by AERZEN.

With a cascaded operation of speed variable blowers and compressors, wastewater companies can optimally adjust the necessary oxygen contents for microbiological cleaning to achieve maximum energy efficiency. Moreover, with comparatively simple technical solutions, the heat originating from the blower air can be used effectively. With this approach, wastewater treatment plants can become self-sufficient in meeting demand for warm water - there is no longer any need for them to use fossil fuels. ○

A pipe bundle heat exchanger recovers heat in the blower air.



Martin May,
Plant manager wastewater treatment plant Filderstadt-Bonlanden

We want to be a role model and a pioneer. Energy efficiency is a very important topic. Therefore, we rely on solutions made by AERZEN.