



AERZEN COM·PRESS

AERZEN compressor station In use for research



Aerzen Rental as partner Tunnelling in groundwater



LET'S TALK tour through Germany AERZEN on big roadshow



Dear Readers,



Klaus-Hasso Heller, AERZEN CEO.

"Mechanical engineering meets architecture" might be the phrase that comes to mind when looking at the Zermatt wastewater treatment plant. Here, on and in the mountain, a plant of a special kind, equipped with AERZEN blower technology, was developed. Our "LET'S TALK Tour" is currently demonstrating what else AERZEN can make possible in the field of wastewater technology. We are still on

our way through Germany until May 2020 with this tour.

These are just two of our many special projects in 2019, and the opening of the mechanical engineering campus of Leibniz University Hanover was another highlight for us in several respects: this is one of the biggest projects we have ever carried out. Hanover is "just around the corner" and some of our junior staff comes from exactly this place.

We are now looking forward to 2020 with great anticipation, although the prospects for the mechanical engineering sector do not seem particularly positive at the moment due to ongoing trade disputes world's major international trading-blocs.

I wish you all good luck and the best of health for 2020!

Cordially yours,

The Zermatt wastewater treatment plant has two treatment lines. They are located opposite one another and are equipped with exactly the same technology. Here is one of the two machine rooms, equipped with positive displacement blowers made by AERZEN.



Not much to see: the Zermatt wastewater treatment plant clings to the Alpine massif unobtrusively. Behind the door, state-of-the-art process technology is revealed.

A combination of five AERZEN blowers, type Delta Blower, supplies the activation and coarse ventilation of the diaphragm filters.



Wastewater treatment: Blown up into the mountain

In Zermatt, the wastewater treatment plant is hidden inside the Alpine massif

To accommodate it, extensive caverns were created inside the Alpine massif itself, following major excavation work which took five years to complete. Since then, Zermatt, also known as a "tourist magnet" at the foot of the Matterhorn in the Swiss canton of Valais, has been cleaning its wastewater subterraneously, behind closed doors. Inside the caverns, AERZEN blower technology provides adequate ventilation of the filter lines and activation.

Zermatt lies in a narrow valley, called the Mattertal. "The wastewater enters the treatment plant from both sides of the valley," says Beni Zenhäusern, Production Manager. The street that runs in front of the entrance portal to the ARA Zermatt therefore has an underground cellar. The computer system and the sand-grease collector are installed here. "A pumping station delivers the pre-treated wastewater 11 meters upwards, before it is separated into two identical treatment lines."

Zermatt is a phenomenon in wastewater technology. This place has only 5,600 inhabitants. However, the treatment plant has a capacity of 76,000 population equivalents (EEC).

Some background to this: During the peak season in winter and summer, dirt loads arrive that reach a chemical oxygen demand (COD) of 60,000 for complete degradation. A COD value of 60,000 EEC corresponds to that of a medium-sized city. The high freight volume and the enormous COD value for wastewater

treatment can be explained by the discharge gastronomy.

Energy-optimised and standardised blower technology

Biology lies further inside the Alpine massif. The two basins of denitrification are connected in a Y-shape to two filter lines, which are functionally part of nitrification. Five filter cassettes form one filter line. Each cassette has 48 hollow fibre units. For the necessary oxygen supply, ARA Zermatt uses identical AERZEN Delta Blower machinery in two blower rooms. Five positive displacement blowers, type GM 50 L (max. 90 kW, 3.300 m³/h, max. 700 mbar) are installed. These fifth generation blowers from AERZEN are energy-optimised and deliver up to 50 standard cubic meters per minute with an engine power of 45 kW.

A special feature of the design was that Zermatt lies more than 1,600 metres above sea level. This has a



2

AERZEN is World Market Leader

Big thumbs-up from Wirtschaftswoche: In a study, the renowned German business magazine has found out that AERZEN is the world market leader 2020 in the field of "Positive Displacement Blowers and Screw Compressors".

The economist Prof. Christoph Müller, from the University of St. Gallen in Switzerland, has developed a robust assessment procedure for the magazine, on the basis of which he draws up a list of world market leaders every year.

Wirtschaftswoche published a tabular overview of the 450 companies with turnover and sectors in which they dominate in a special issue dated 14 October 2019.

"Star of Product" for AERZEN Delta Hybrid

Aerzen China received the award "Star of Product" for the rotary lobe compressor Delta Hybrid at the 14th International Water Conference in Qingdao, China. The event took place from 25 to 28 June 2019. A total of 20 companies were nominated for the award. AERZEN won due to the outstanding performance, reliability and economical energy consumption of the Delta Hybrid. Lang Weiguo, Sales Director Aerzen China, accepted the award on behalf of the company. Tony Chien, Sales Manager Aerzen China for the water industry, gave a lecture on energy savings and new developments in blowers for wastewater treatment.

Aerzen China participated for the second time in the water conference in Qingdao and has already confirmed its participation for the next year. More than 2,500 participants showed great interest in the company's energy-saving solutions and products. The China Association for Science and Technology and the Qingdao Municipal People's Government are the hosts of the event.



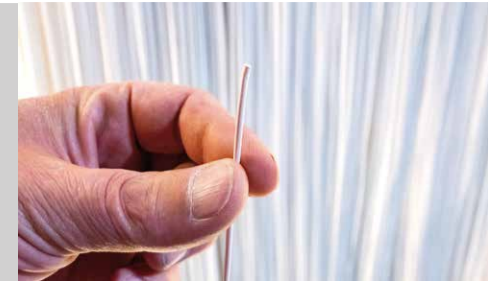
Aerzen China was awarded with the "Star of Product" at the 14th International Water Conference.

Aerzen Turbo Korea successfully validated for US-American CTPAT programme

Thanks to the successful re-validation of Aerzen Turbo Korea as a foreign supplier, Aerzen USA can continue its participation in the CTPAT programme. CTPAT, which is the Customs Trade Partnership Against Terrorism, is intended to strengthen international supply chains and improve border security in the United States. Every four years the re-validation of a supplier abroad becomes necessary, in this case Aerzen Turbo Korea. Aerzen USA has been participating in this programme since 2016, which brings considerable advantages for the import of goods. For example, CTPAT members are subject to fewer customs inspections and waiting times at the border for the import of products are reduced.



Two positive displacement blowers, type Delta Blower, ventilate the sand collector.



The hollow fibre diaphragms filter the water. The openings are so small that even bacteria cannot pass through them.

corresponding effect on the density of the air sucked in. The significant temperature differences between winter and summer also pose a challenge.

From each of the two machine rooms, two Delta Blowers supply the nitrification with sufficient oxygen. Two more Delta Blowers are assigned to the diaphragm filter. "The hollow fibres must always stay in motion during operation. We do this with air," Zenhäusern notes. The remaining fifth blower is mainly assigned to the filter as a reserve, but can also be used for nitrification via a corresponding slide valve position. This design, with identical machinery, makes the power distribution of the blower air flexible, and, as a result of standardisation, reduces the cost of spare parts.

ARA Zermatt works closely with Aerzen Switzerland on service and maintenance issues with regard to operational safety. Michael Schüpbach, the head of the

Service Centre in Frauenfeld, south of Lake Constance, has drawn up a revision plan for all blower packages for the wastewater treatment team.

Diaphragm filters are also important in connection with operational reliability and long-term availability. After ammonium nitrate degradation, they separate the activated sludge from the biologically purified water. The water is sucked through the diaphragm into the interior of the hollow fibres by vacuum. The pressure difference is generated by a rotary piston pump. The air from the blowers acts as continuous coarse ventilation. This is necessary to keep the diaphragms moving, as the diaphragm openings only measure 0.04 micrometers, which is too small for bacteria. Therefore, the diaphragms would clog immediately if the air-water flow fails.

In total, underground biology has a filter area of 32,500 square metres. This is roughly the size of 4.5 soccer pitches, and it all happens in the smallest of spaces. Add-

ing up the hollow fibres, their total length of around 5,000 kilometres would stretch from Zermatt to Dubai. "We make a living from tourism," says Beni Zenhäusern. For this, the town has invested in a wastewater treatment plant which has ten times more capacity than the population actually needs. In addition, there are the strict wastewater regulations. Whereas in Switzerland the limit value is 0.8 mg phosphate per litre, in Zermatt it is only 0.5 mg due to the receiving water. In view of these constraints, the wastewater treatment plant in Zermatt exclusively uses technology which meets the highest demands on availability. AERZEN holds the position of manufacturer and partner at the same time - in addition to providing pure technology, the company also passes on its know-how over the entire life cycle.

Customer Satisfaction Survey Eastern Europe

AERZEN is very well positioned

Customer opinions are valuable and extremely important to us. We have therefore asked a significant group of customers in Eastern Europe to participate in a customer satisfaction survey. Thanks to the great response, a representative survey with 300 customers from the Czech Republic, Hungary, Poland, Romania, Russia and Slovakia was carried out.

During this survey, both overall satisfaction and loyalty, as well as the individual performance characteristics in the different value-added areas of AERZEN, were recorded. The results are based on a points system (0-100), from which action needs were derived to further improve our performance.

General assessment

"How satisfied are you with AERZEN?" This question was answered with 84 points, i.e. with "very satisfied." When asked about long-term overall loyalty, 85 percent of the customers surveyed rated us as a very loyal and future-proof partner - pleasing results that nevertheless point to potential for improvement. We'll deal with it!

Evaluations of the various value-added areas

These very good ratings should not be a reason for us to be inactive. This is because, as is so often the case, it is crucial to go into more detail and to examine the individual value-added areas and performance criteria carefully. Because customer satisfaction and loyalty are directly related to the importance of the individual service areas. The performance criteria "products" and "field service" are the most important areas of evaluation for

our customers. We are pleased that we can record very good results there in particular (almost 90 points). In other key areas such as "local headquarters", "quotation preparation", "order processing" and "delivery service", the assessment was consistently positive (between 83 and 87 points). Even though "complaint management" only plays a subordinate role, the evaluation gives us a clear signal. Here we will improve.

Consequences and further action

Our customers have told us that we are already very well positioned in Eastern Europe. Nevertheless, we are constantly working on our performance, which we

intend to further improve, especially with regard to the criteria "after sales service" and "complaint management". These very customer-oriented parameters are decisive for customer-oriented cooperation.

This is what we want to achieve

This year's customer satisfaction analysis has provided us with clear insights. Despite the good values, we were shown where optimisation measures are necessary. We now have to do our homework, interpret the feedback and translate it into initial measures. Our main objective is to offer our customers a cooperation which is smooth and more effective in terms of both time and cost.

Performance Range	Importance	Action Required	Evaluation
Products	+++	■	Very good
Field Service	+++	■	Very good
Local Headquarters	++	■	Very good
Preparation of Quotations	++	■	Very good
Order Processing	++	■	Very good
Delivery Service	++	■	Very good
After Sales Service	++	■	Good
Local Marketing	+	■	Good
Complaint Management	+	■	To be improved

The most important results from the Customer Satisfaction Survey Eastern Europe

Mechanical Engineering Campus of Hanover University Inaugurated

AERZEN compressor station in use for research

The starting signal was given on 19 September 2019 with the opening ceremony of the ultra-modern mechanical engineering campus in Garbsen: Leibniz Universität Hannover can conduct practical research on thermal turbomachinery, which is used in aircraft engines and power plant turbines, for example, and can undertake research into the "Dynamics of Energy Conversion (DEW)." The AERZEN compressor station plays a central role here.



Inauguration in Garbsen (from left): Lower Saxony Minister of Science and Culture Björn Thümler, Mayor of Garbsen Dr. Christian Grahl, President of Leibniz Universität Hannover Prof. Dr. Volker Epping, Minister President of Lower Saxony Stephan Weil, President of the Hannover Region Hauke Jagau, Dean of the Faculty of Mechanical Engineering Prof. Dr.-Ing. Jörg Wallaschek

The AERZEN compressor station in Garbsen is responsible for the dynamic drive of turbomachinery and power plant test benches. Two large blowers type GM 20.20 and two screw compressors type VRa 736S, including measurement and control technology, form the system. "The uniqueness of the set-

up lies in the fact that the test benches operate dynamically with almost freely selectable load ramps and are thus able to map the actual operation of existing and future turbomachinery much better," according to a DEW press release.

"The air must have specific properties, depending on different tests. To achieve this, pressure, temperature and volume flow must be set independently of one another on the selectable test benches - otherwise the tests will not be carried out successfully," explains Pierre Noack, Head of Supply Process Gas.

With a total drive power of 8,000 KW, this multi-year project is one of the largest German orders in the history of AERZEN. "For us, it is definitely a special project - not only because of the volume,

but also because of the physical size: large machines with which we can deliver high performance, yet with the minimum tolerances we have to comply with - the whole project is huge," says Noack.

AERZEN won the order in 2016. In a hall of Aerezener Maschinenfabrik a scaled-down and simplified, but fully functional, model of the compressor station was built. Among other things, it is used to test control and regulation technology, evaluate corresponding methods and to investigate operating behaviour before actual commissioning.

Overview of the complexity of the AERZEN compressor station



A special practical report on the VML 250 screw compressor

Flexibility, customer centricity and an unusual inspection witnessed by the customer

A Danish biotechnology company wanted to replace its existing turbo compressors used in a fermentation process. The customer ordered from AERZEN a function test at full speed and pressure difference in connection with a sound measurement. The aim of the test was to ensure that the AERZEN Delta Screw packages VML 250 deliver the agreed performance (> 200 m³/min at 20.0 bar).

In the AERZEN Acoustics Hall, up until now only machines of up to 500 kW have been tested in frequency converter operation, so Aerzen Rental helped out with a 1.2 megawatt diesel generator (= 1.2 million watts), which could supply enough energy by means of a special circuit to operate the assembly. Normally, the generator is started up and only when it is running at full speed is the assembly switched

on. Without a frequency converter, however, the current consumption of the motor increases tenfold. As there was no frequency converter with sufficient power available, the machine was started in parallel with the diesel generator, which slowly pulled the electric motor up to speed.



The Delta Screw package VML 250 during the function test in the AERZEN Acoustics Hall

Aerzen Rental contributed a 1.2 megawatt diesel generator for the function test.



AERZEN has everything under control

The start button was pressed and the thick cables were pushed apart by the enormous magnetic field. The assembly started reliably and stabilised at the predetermined speed. After a preliminary test, the cus-

tomers was presented with his machine the next day.

On the day of acceptance testing everything went smoothly. The machine was able to maintain the promised values, the customer was satisfied and thanked AERZEN for our efforts.

Craig Russell leads the Middle East and Africa

At the beginning of September 2019, Craig Russell took over as Managing Director of Aerzen Gulf and Head of the Middle East & Africa. Born in Scotland, he will lead the AERZEN Group in the Middle East and Africa from Dubai and sees great potential in the region: "Taking over responsibility for the Middle East and Africa is a privilege for me," says Russell. "The emerging markets generally offer us numerous opportunities, and this region is definitely already very successful. I support many of the initiatives that have already been launched, such as the expansion into East and West Africa and the development of local production."



Craig Russell

Russell has lived with his wife and two children in Dubai for many years, where he initially worked for American and Japanese family businesses in the food processing and packaging industries and later was responsible for the restructuring and sale of engineering companies.

New Head of Supply Process Gas

Walter Reiter has taken over the global management of Supply Process Gas at AERZEN and succeeds Pierre Noack. Reiter has over 30 years of experience in management positions in German plant and mechanical engineering companies.



Walter Reiter

New Head of After-Sales

Björn Heuer took over the management of After-Sales from Bernd Brakemeier on September 1, 2019. With more than 25 years of professional experience, including time as service engineer and product manager for Delta Blower and Delta Hybrid, he has extensive practical experience as well as in-depth product and application knowledge. For the past five years he has been responsible for the After-Sales Field Service division.



Björn Heuer

Questions, Suggestions, Ideas?

We are looking forward to all your queries, comments and suggestions on our customer journal and we are at your disposal for further information on AERZEN products and services. Give us a visit on our website:

www.aerzen.com/news

Aerzen Rental establishes itself as a competent partner for preliminary application

Under pressure: tunnelling in groundwater

In Karlsruhe, an underground tram line is being built between Ettlinger Tor and Marktplatz. The tunnel, which is just over 300 metres long and passes through the centre of the city, is challenging because of its special geological formation. To prevent water penetrating into the construction site, the company Pressluft Frankfurt Drucklufttechnik GmbH relies on our compressor technology.

Anyone who stands on Karl-Friedrich-Straße in Karlsruhe during a downpour and takes a look at the asphalt will notice a fine-pearled foaming road. The reason: the tunnel underneath, with its base 15 metres below street level, loses air. "Here, we have to deal with a lot of sand, gravel and loose rock. These are materials which are not useful in tunnel construction," says Robert Schweitzer, Construction Manager, describing the challenges he faces in the centre of Karlsruhe. On one side, due to the geological conditions, BeMo Tunnelling GmbH is forced to stabilise the walls by propelling shotcrete at them, as otherwise the ground could behave unpredictably. On the other side, the pores are so large that the ground water would run directly out of the walls if the appropriate counterpressure is not provided on site. This leads to the conclusion that the work is literally under pressure. In the first construction phase, this is at a delta of 0.75 to 0.85 bar to the atmosphere. Therefore, the project is subject to German compressed-air regulations which define the relevant rules regarding job safety. Against this background, nobody is permitted to enter the pressure

lock without a special briefing - and must not leave it without decompression taking place.

The pressure sluice supplies data to a control room where the sluice monitor always has an overview of the operating status of all compressors on a display. Twelve assemblies are installed - four underground and eight on the road directly above. The spatial division is due to the fact that soil analyses undertaken at the beginning of the tunnel project suggested a higher degree of impermeability. This assessment subsequently proved incorrect and thus the flow capacity which had been calculated for the compressors did not apply either. "Making forecasts for old riverbeds is almost impossible." We simply do not know what to expect", says Peter Engelke, project manager of Pressluft Frankfurt. The company received an order from BeMo to design the compressed air according to the initial soil analysis in the Rhine plain.

Efficient and quickly available solution

As it soon became clear that the calculated performance would not be sufficient, Pressluft Frankfurt and Aerzen Rental

In Karlsruhe, the eight CVO4400 units of Aerzen Rental are combined into two-storey units to save space.



started looking for an efficient solution that would be quickly available. "The cooperation between all three companies is quite flexible and very professional", emphasises Engelke.

"We have integrated the compressors with Delta Screw packages (VM 60, 1.140 to 4.550 m³/h, 45 to 250 kW) as core within container frames. These can be easily transported, combined to form space-saving units on site and, thanks to the cartridge design, can also be stacked on top of each other," explains Peter Link who is responsible for the German rental business. The headquarters of Aerzen Rental is at Duiven in the Netherlands. In Karlsruhe, the compressors type CVO4400 are combined with water coolers which cool down the air outlet temperature of the compressor from 120°C to 20°C.

Efficient reserves are required

During the not so deep work, the assemblies pump 100 to 140 cubic metres of air per minute into the tunnel on a daily

Four compressors - initially provided for underground work - are not sufficient to reliably prevent the groundwater from penetrating, due to the sandy soil.



average. This also explains the foaming road when it rains. The deeper the site is, the more the pressure increases from the groundwater. Robert Schweitzer expects a pressure delta of up to 1.3 bar by the end of the structural work. Therefore, the pressure losses will increase exponentially and a higher volume flow will be required. For this reason, and according to the compressed air regulations after sufficient redundancy, the equipment supplied by Aerzen Rental covers adequate reserves. "We have to cover the complete demand by two thirds of the installed machine performance. Four of the twelve assemblies serve as spare machines", explains the mechanical engineer. "The specific performance of the assemblies is unrivalled," emphasises Engelke, describing the start of cooperation between AERZEN and Pressluft Frankfurt more than 30 years ago. "In all these years, I have never had a broken machine - this signifies long working life and reliability."

In Karlsruhe, the speed of the compressors is adjusted so that their actual performance corresponds exactly with the pressure losses from the tunnel - these measure 15,000 cubic metres from Marktplatz to Ettlinger Tor. In addition, it is economical for BeMo Tunnelling and Pressluft Frankfurt to rent these compressor packages in such special application cases, instead of buying them. And the independent Aerzen Rental service takes care of all the maintenance during the time that the equipment is in operation. ○

IMPRINT

AERZEN COM-PRESS

Customer journal of
Aerzener Maschinenfabrik GmbH
Edition 3-2019

Editor

Aerzener Maschinenfabrik GmbH
Reherweg 28
D-31855 Aerzen GERMANY

Editorial staff

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

Picture credits

AERZEN, Aerzen China, Moritz Küstner/LUH
(page 3 above), sienk.de

Realisation

Maerken Kommunikation GmbH
Von-der-Wettern-Straße 25
51149 Cologne
Number of copies: 9,200



AERZEN "LET'S TALK" Tour

AERZEN goes on a big roadshow

Since the beginning of October 2019 AERZEN is on a big tour through Germany. As part of the "LET'S TALK" Tour, we are visiting operators and engineering offices in the field of wastewater technology to discuss their needs and requirements and our individual solution concepts.

The ubiquitous question in the industry is: "How efficient is revitalisation in the clarification process really?" It is a reasonable question to ask, as the aeration of the aeration tanks usually accounts for the lion's share of the annual electricity costs of the entire plant. "We want to show how tailor-made plant concepts can enable significantly more efficient aeration, minimise operating costs in the long term and also protect the environment. Therefore, a more resource-efficient aeration of the plant is always worth a discussion," says Markus Leidinger, Application Manager Wastewater at AERZEN.

One approach is the use of turbo blowers with air foil bearing. With an installation area of less than 1 m² the Aerzen Turbo AT50 G5plus is the smallest machine

on the market. The AT50 G5plus is also the most efficient machine in the lower volume flow range at very low sound levels. The innovative air foil bearing, with a service life of over 80,000 operating hours, makes the assembly virtually maintenance-free and guarantees absolute process reliability even during pressure peaks. "We make these convincing fea-

The AERZEN "LET'S TALK" Tour runs until May 2020.



tures tangible, because we simply bring the AT50 G5plus with us and demonstrate the machine's capabilities on site. In addition, we have many other topics with us that will make your plant more resource-efficient. We are looking forward to many interesting discussions," adds Markus Leidinger. The Germany tour will continue until the IFAT Trade Fair in May 2020. ○

