



AERZEN COM·PRESS

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The compressor packages made by AERZEN are housed in compact structures. Thanks to the air supply, directly provided above the aeration tanks, the need for long and expensive supply piping has been avoided.

Why does modern aeration technology make the treasurer happy?

The AERZEN combined system provides optimum efficiencies at the Wallau wastewater treatment plant.

The combination of different technologies for air conveying enables optimal energy use of oxygen for biological degradation processes in wastewater treatment plants. Concrete savings resulting from the use of AERZEN machines demonstrate this in practice at the Wallau plant.

In 2016, the independent central Hessian wastewater association "Perfgbiet-Bad Laasphe" modernised its wastewater treatment plant on its own, with only the support of "UD Umwelt-Dienste GmbH". "If we had gone the way of a tender, a less expensive solution would probably have been selected, but not necessarily the best one," explains Production Manager, Gernot Wege. His team on site knows everything about the plant, particularly where oxygen demand in the aeration tanks is concerned. So, the wastewater association started searching for a solution with this data in hand. Today, a blower combined system, consisting of Turbo and Delta Hybrid, with connected AeroStrip fine-bubble diffusers made by Aquaconsult, guarantees perfect oxygen entry in the aeration tanks. 39,000 inhabitants on both sides of the River Lahn are connected to this wastewater treatment plant.

It was easy to install the new and modern fine-bubble diffusers directly onto the base of the tanks. The mounting layouts did not have any negative influence on the water level, which remained stable. Thanks to this system change, the surface aerators which had hitherto been used, became a thing of the past. Two concrete bridges mounted to the rotor units above the aeration tanks were also no longer needed. "We were able to use the newly available space to mount the new blowers," explains Rüdiger Vrabac, Division Manager, UD GmbH in Friedberg.

The now-available space used anew

Each bridge now has a small structure which protects the combined blower system from wind and weather. Furthermore, the housing provides noise protection. The decentralised setup directly above the aeration tanks also has another advantage for Vrabac: "We saved not only on construction costs, but also on long and expensive stainless steel supply pipes."

The tandem mode is mainly designed for considerably differing load requirements during winter and summer time. For higher air requirements during the summer months, the wastewater association uses the AERZEN turbo blower as an efficient base load machine. For this purpose, the type AT 100-0.6 S supplies a volume flow up to 4,200 m³/h. In winter, the system can switch to Delta Hybrid, as less oxygen is necessary for aeration at this time of year. The maximum volume flow of type D 36 S is 2,150 m³/h. The major difference evident at Wallau is the result of its special geology, as the sewer system carries a comparatively high level of groundwater, which strongly dilutes the waste water. Due to a schist layer, the rain cannot be directly drained.

Eventually, however, the energy savings of 15% forecast at the beginning of the project in Wallau were considerably exceeded. The new combined system has already achieved savings of 26% in respect of the electricity demand of the entire wastewater treatment plant. In view of the fact that the aeration needs only half of the previous electricity demand, the retrofitting in this sector yields savings of more than 50%. ○

Dear Readers,



Klaus Grote,
Sales Management

We are already well into the new year and the weeks have passed by in a flash, as always. In this edition of AERZEN COM.PRESS, you will learn something about AERZEN's new opportunities and challenges and how we intend to remain a reliable partner going forward.

There is information about the latest developments in AERZEN machines, and how you can benefit from our innovations. These include modular systems for large blowers - finely graduated for direct drive and with variable flow direction, or components for wastewater treatment - from air generation to plant control.

And now, please enjoy reading lots of interesting information from AERZEN!

Cordially yours,

Production facility in Shanghai has been redesigned

The production facility of Aerzen Int. Trading in Shanghai now has a new factory layout, thus positioning itself for further growth in the assembly construction sector. At the end of 2016, as part of the replanning process for the entire production division, various layout variants, assembly and logistics processes were designed and assessed. The factory structure which has been developed combines site-specific conditions and experiences, as well as proven AERZEN processes and Lean criteria - and the subject of Feng Shui was carefully considered by the planning teams in China and the parent company. The new factory layout has been designed so that production can be adjusted flexibly in several stages to match sales growth and a modified product portfolio.



The new factory site of Aerzen Int. Trading

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 service technician on the high seas

For AERZEN After Sales, no journey is too far, no place is too dangerous and no assignment is too complex. At the beginning of December, in Brevik, Norway, an AERZEN service technician took up a post on the cement cargo ship "MV Cembay," to exchange the drive shaft of an AERZEN VM 85 compressor which had been damaged by a loosened coupling. As the necessary tools were not available on board, he had to transport these in his own luggage, which involved a substantial weight.

Specifically for this job, eye bolts were welded onto the ceiling of the ship. On these eye bolts, the compressor stage was lifted off the assembly by means of chain hoists. The confined space in the machine room, and the pitching and rolling of the ship in rough seas, did not make the job any easier.

In total, four compressor packages of this type are installed on the cargo ship for the unloading of cement. In addition, it is equipped with two AERZEN Delta Blower GM60S assemblies.

Service assignment on a cement cargo ship



The new large blower series Alpha Blower



Alpha Blower

New modular system for large blowers has 104 variants

With the launch of the new large blower series Alpha Blower, in April 2017, AERZEN will be able to offer the perfect and efficient machine for numerous applications. This new concept improves on even existing qualities without neglecting proven procedures.

With various profile sizes and length changes of the cylinder, AERZEN is now able to offer a model variance of 26 machines with this new modular system for large blowers, Alpha Blower. Furthermore, customers can select from a range of two and three-lobe rotors, as well as horizontally and vertically conveying machines, depending on the field of application and installation site. This increases the number of types of machine available to 104 variants in total.

All-rounder

The field of application covers volume flows from approximately 9,600 m³/h to 77,000 m³/h. They operate at a maximum differential pressure of +1,000 mbar (g) or a negative pressure of up to -800 mbar with pre-inlet cooling.

Alpha Blowers are, for example, suitable for use in air separation plants. They can also be used for pneumatic conveying in the cement, foodstuff and chemical industries, both in overpressure and negative pressure operation.

Their impressive features include energy efficiency, robustness and durability. The series uses only high-quality components - the continuous rotor shaft is made of alloy steel, for example. Thanks to a new sealing concept of the drive shafts, the standstill times will also be reduced during overhaul.

Troubleshooter

In addition, AERZEN offers a variety of accessories, such as vibrational monitoring for early detection of bearing damage as well as contact protection, which prevents the rotors from contacting the cylinder and

side plate and therefore protects the machine against damage.

The new "AirSilence" technology ensures quiet operation of the two-lobe machines. Cavity sockets on the discharge side reduce pipe noise. AirSilence works according to the principle of attenuation of differential pressure. Due to supercharging in the conveying chamber, the pressure is increased and the differential pressure is artificially reduced towards system side. Consequently, pipe silencers and other sound reduction measures enable smaller dimensioning.

The advantages

- Finest volume flow gradation via modular design
- Integrated sound reduction technologies
- Completely integrated oil system incl. oil reservoir
- Sealing group of conveying chamber easy to change
- 100% absence of oil class 0 according to ISO 8573-1
- Best energy efficiency due to pinpoint design of the machine (ASME).

Patented AERZEN silencers

Noise doesn't only harm ears

With reactive silencers, AERZEN reduces noise emissions on the discharge side of its screw compressors, positive displacement blowers and rotary lobe compressors.

High frequencies involve strong oscillation forces, and as a result, sound waves generate vibrations in the damping material of conventional silencers. The effect is called micro friction, and is also seen where insulation material is made out of stainless steel. If, with rapidly pulsating pressure variations, high temperatures at the blower outlet also occur, the filter material will weaken and slowly start to dissolve. The result is that: on the one hand, the silencer loses its effectiveness over the operation period, while on the other hand, the absorbable filter material continuously contaminates the process air.

Therefore, the AERZEN competence centre for silencers, including production, has decided on a different approach: unlike solutions which use absorption ma-

terial, the principle involves the use of sound waves which cancel each other out, thereby preventing contaminations of the process air resulting from the erosion of insulation material. Moreover, reactive silencers act as a spark extinguisher in relation to Ex-protection applications. Possible sparks sink to the ground and cannot penetrate further into the pipe.

The active principle of a reactive muffler can be compared with the solution of microphones and speakers. Sound waves are measured, and then a coordinated counter noise is generated which eliminates the original noise. Such a procedure is currently used in high-end audio headsets. With reactive mufflers, a special internal pipe system is responsible for this time-delayed superimposing of sound waves. AERZEN is unique in having this patented

solution in the market, and it is also used for directly driven screw compressors. With a view to future worldwide application, the perfectly adapted modules are certified according to the directives of international compressed-air regulations. Within the EU the guideline 2014/68/EU is applicable - in Germany designated as the Pressure Equipment Directive (PED). Moreover, comparable global regulations have been defined by the expert association for pressure reservoirs of the American Society of Mechanical Engineers (ASME).

The AERZEN reactive silencers offer many advantages.



AERwater

Integrated solution on the road to Water 4.0

Water 4.0 is becoming increasingly important in German wastewater technology. The AERwater concept considers the requirements for digitalisation, automation and resource efficiency as an integrated solution.

Interlinking, resource optimisation for energy, time, personnel and investments, increasing process and system awareness along with plannable service – all aspects which justify Water 4.0.

Another factor driving the topic of digitalisation is the so-called Z Generation, which has grown alongside the Internet and which will be released in the working world in the next five years. Consequently, Water 4.0 by analogy with Industry 4.0 is receiving an additional thrust for „Networking of machines, processes, storage systems and operating equipment“.

In addition to energy check, energy analysis, energy optimisation, energy management and service monitoring are also included in the AERwater concept from AERZEN. In four steps to Water 4.0:

Energy check

When the process-relevant data of a blower station is logged, the really driven volume flow is not always transparent. Combined with pressure and temperature recording, these are however the key data required to determine an annual characteristic curve of an activation tank with respect to air requirement and energy efficiency.

AERaudit, developed specially by AERZEN, offers a solution: A measuring case system consisting of a volumetric flow sensor suitable for forced compressors allows the actual volumetric flow measurement to be taken in-situ and also displays the power requirement. The corresponding working pressures and operating temperatures are likewise documented.

Often, the data logging process reveals that the machines being used are dimensioned too large and run in energetically unfavourable operating points. The blower technology employed is also often outdated.

Energy analysis

The goal now, using evaluation technology and based on the frequency of the load profiles run, is to find the energetically most efficient machine combination. With Performance3 – positive displacement blowers, Delta Hybrid and turbo machines – AERZEN offers all three machine technologies from a single source. But not all three actually need to be used. Instead, the best option in terms of energy efficiency must be selected from all the available variants for each individual application. Aspects such as dimensions and noise development of the machines can also be integrated into the concept.

Our newly developed calculation program AERselect offers the option of calculating room ventilation adequately dimensioned for the machines. A host of other features such as displaying the energy optimisation, preventing pipework losses, heat recovery, reducing noise development, CO2 reduction, life cycle cost and ROI calculation, all help implement the integrated approach to resource optimisation in the best possible way.

If the new machine concept and a clean analysis for energy optimisation and reducing CO2 emissions are available, state funding can be requested. Depending on the German state, up to 50 percent of the concept funding and up to 90 percent of the investment funding is subsidised.

Energy optimisation

The primary aim is to achieve the best possible energy efficiency for the specific application. Blanket statements on a possible energy saving are not possible without knowledge of the reference parameters. First, we have to understand and analyse the individual and often complex operating processes of a blower station.

Only then specific and reliable statements can be made. Only then can the oxygen requirement for every load case be met with the most efficient machine.

Through the Performance³ concept in conjunction with the newly developed design tools, AERZEN is able to deliver a customised compressor station from a single source.

Energy and service management

The reliable data logging of the newly developed AERsmart control system also permits energy analyses of the machines currently running. So, the current actual value can be evaluated and compared for a longer period of time. If required, measures for energy optimisation can be introduced. And so the output values of the compressor station recommended in DWA Regulation A 216 are available at the push of a button.

AERsmart optimally distributes the required air quantity in all load cases across the individual efficiencies of the installed machine combination and can be connected to higher-level control systems. As a result, the installed machinery is operated as close to the theoretically highest efficiency as possible. The result is an energy saving of up to 15 per cent. Another benefit: Blowers from other manufacturers can also be integrated into the control system. Engineering consultants, equipment manufacturers and operators receive an integrated concept from a single source to be able to visualise, communicate and optimise process relevant machine data and ultimately manage the best possible energy concept.

Service Monitoring can also be replicated in this control system concept in the future. Service intervals are visible at any time. So, spare and wear parts or essential service work can be requested and ordered directly in the AERZEN service centre.

AERZEN Performance³

In order to engineer suitable solutions for each application, different technologies are used in the wastewater industry. A combination of these high-performance technologies is ideal for achieving maximum energy efficiency they must be perfectly adapted to each other and able to handle changing requirements. With Performance³ AERZEN is able to provide optimal solutions, all from one source: For example for production of the base load requirement **AERZEN Turbo Blowers**; for production of peak or low load requirements, **AERZEN Positive Displacement Blowers** of series Delta Blower as well as **AERZEN Rotary Lobe Compressors of series Delta Hybrid**.



AERZEN Turbo Blower, Delta Blower and Delta Hybrid offer Performance³: highest levels of operational safety, reliability and efficiency

AERsmart: From best to very best performance

The impressive performance of AERZEN high-performance compressors can now be sustainably increased even further with AERsmart. The innovative control combination is the intelligent component or 'conductor', which arranges volume flows amongst the machinery in a mode that low, medium and high loads can be processed efficiently as per existing configuration. AERsmart can provide the highest efficiency through the perfect interplay of up to twelve machines, including third-party products.

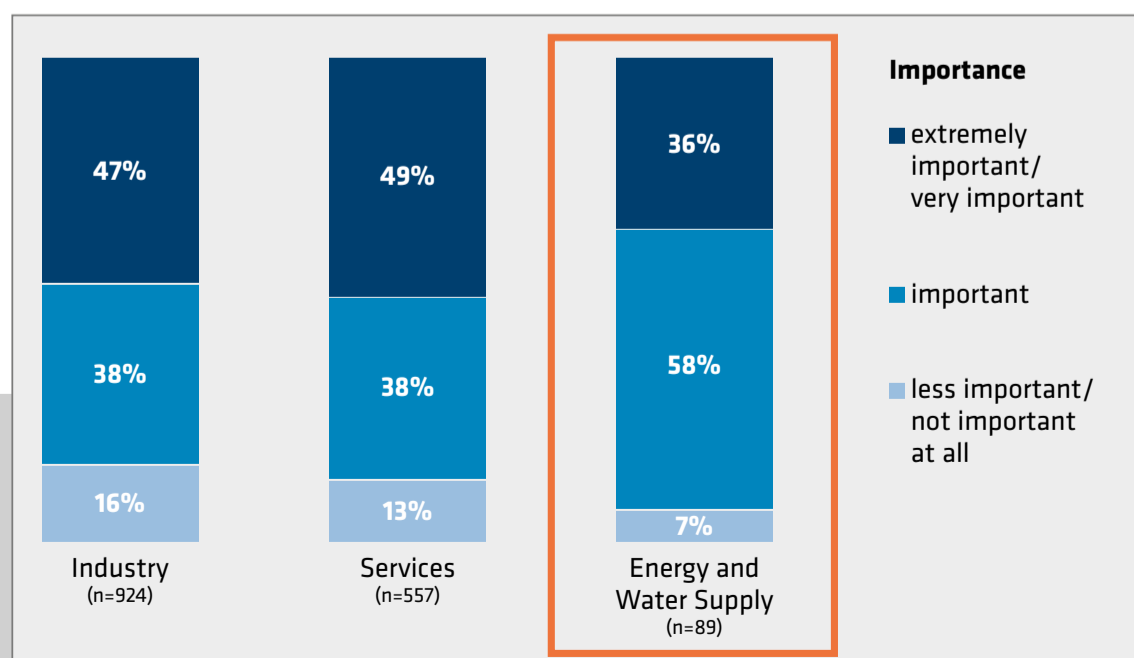
AERsmart also convinces because it operates fully in line with new guidelines from the DWA (German Association for Water Economy, Waste Water and Waste) for the energy efficiency and energy analysis of wastewater treatment plants. And besides, as an intelligent interface, it is already pointing the way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



AERsmart makes most efficient operation of wastewater treatment plants possible.

The new Delta Blower G5plus

The new Delta Blower G5plus combines proven features with the latest technological advances, such as: **A plus of efficiency:** the G5plus achieves energy savings of up to 5 per cent by means of optimised intake filter silencers, an improved standard base support, an electrically-driven fan, as well as by routing the warm exhaust air over the roof of the acoustic hood. **A plus of comfort:** based on the new acoustic hood concept, the installation surface area is reduced by up to 10%. The assembly has an acoustic hood door which facilitates the maintenance process. **A plus of flexibility:** as optional extras, the G5plus can be supplied with a mechanical fan (which reduces electricity consumption), and with a multifunctional base support with integrated spark arrester (ATEX-certified). Furthermore, it is provided with a preparation for the installation of the start unloading device as well as with components for installation of third-party motors.



In the monitoring report Wirtschaft Digital 2016, 94 percent of companies in the energy and water supply sector consider the digitalisation process to be very important.

TRADE FAIR SPECIAL

AERZEN blowers are among the largest worldwide and have been designed for the sophisticated requirements in steel industry.



Delta Hybrid D 98 V: Negative pressures down to -0.95 mbar

With the new special machine Delta Hybrid D 98 V, the range of maximum possible negative pressure of the AERZEN rotary lobe compressor series has now been expanded further, down to -950 mbar, which is close to the vacuum range. This improved performance has been made possible through an ingenious approach for the supply of cooling air via additional pre-inlet channels. The new machine type offers clear advantages with its increased negative pressure capabilities - transport of heavier materials, over longer distances and/or with higher speed. The result is that, whatever the circumstances, the efficiency of loading and unloading increases. The D 98 V, which can generate overpressures of up to 1,500 mbar, can operate via both mobile or stationary platforms and supplies a maximum volume flow



The new machine type D98 V

New accessory solutions

AERZEN now offers for its blowers, hybrids and oil-free screw compressors, a complete programme of water-air aftercoolers with suitable cyclone separators and drains. The product range is supported by a separate design programme which can determine the most suitable cooler in a matter of seconds. It also serves to determine solutions for heat recovery, so that AERZEN is available to advise its customers extensively concerning possible savings.

New drive for vacuum blowers

At the beginning of this year, AERZEN introduced a new motor to drive its vacuum blowers. The robust and compact AERZEN vacuum blowers, suitable for permanent operation, and with hermetic drive, are used in industrial high vacuum technology for a vacuum range of 200 to 10⁻⁵ mbar, together with one or two backing pumps. The drive shaft is sealed with an integrated canned motor without any connecting passage to the atmosphere. Due to the doubling of the speed to the 6,000 - 7,200 rpm range with the same size, pumping cycles in the seconds range result, which results in considerably faster production processes.

AERZEN vacuum blowers series HM for neutral gases are available in nine sizes. Due to the standard water cooling they are appropriate for application under clean room conditions. The application of a frequency converter makes a high control range (1:5) possible, and therefore the use of smaller blower sizes. Thanks to different motor variants for cyclical and continuous operations, an individual solution can always be found, even for special applications.



New hermetically sealed motor for AERZEN vacuum blowers

AERZEN ensures perfect vacuum and high-grade steel

Out with everything that doesn't fit in

Vacuum is required so that steel - high-grade chromium steel in particular - achieves the desired quality. This requires the liquid steel, after the blast furnace in secondary metallurgy, to reside in pressure chambers to allow gases such as oxygen or carbon monoxide dissolved in the melt to bubble out. Here, blower and compressor technology from AERZEN is employed all over the world.

The current oversaturation of the global steel market is calling for an even stronger focus on the refinement process. In light of this development, VOD (vacuum oxygen decarburization) and AOD (argon oxygen decarburization) installations are gathering importance in terms of technical interest. Because both methods work with vacuum, modern solutions that generate this vacuum reliably and economically are in demand. Electro-mechanically-driven roots type blowers and screw vacuum pumps are replacing traditional steam jet pumps. The move away from process steam is significantly improving energy efficiency.

More energy-efficient

The benefits are obvious: When a cascading network of electrically-driven roots type blowers and screw vacuum pumps is used, steam jet pumps are no longer necessary. This substitution also ensures that the complex pipework infrastructure between central steam boiler and the pumps can be eliminated. The same applies for steam generating boilers that are no longer required. Another benefit of vacuum generation via electromechanically-driven pumps: The AERZEN units require electrical energy only when they are operating. So the energetically dubious and expensive standby mode, which is needed to keep the steam boiler constantly pressurised, becomes superfluous. The more intelligent generation of a demand-based vacuum therefore notably increases the energy efficiency of VOD and AOD processes - without compromising output or product quality. The efficiency of this method is currently being demonstrated by a new VOD system in a foundry in Linz, Austria, which is equipped with this very technology.

VOD and AOD were the two methods of further reducing the carbon content of stainless steels. The difference is that with VOD, the gases dissolved in liquid steel are encouraged to bubble out at the

surface solely by applying a vacuum at a pressure of around 100 and 200 millibars - not least because the partial pressure of the carbon monoxide is reduced. With the AOD method - argon oxygen decarburization - carbon as well as other impurities are selectively oxidised and expelled from the melt by blowing in an argon/oxygen mixture. With both methods, the liquid steel is transported into the pressure-tight boiler in crucibles. Any vacuum present after the boiler is evacuated must be maintained for a defined time of up to half an hour to ensure reliable decarburisation with high reproducibility of the steel quality.

Large installations for small footprints

AERZEN accomplishes this task with a combination of positive displacement blowers of series GQ and screw compressors of series VRa. In a current project that went into operation in a steelworks in China in 2016, the four-stage setup delivers a pump output of 635,000 cubic meters per hour at a vacuum of 0.67 mbar absolute (0.5 torr). The benefit of the AERZEN solution lies primarily in the dimensions of the positive displacement blower and screw compressors. The assemblies are among the biggest in the world and are designed for the tough operating conditions in the steel industry. In addition to the requirement for fast pump-out times, this also includes operational reliability within a redundant system, which has few installations. The combination of positive displacement blowers and screw vacuum pumps is ideal because, for most of the conveying flow, the energetically-efficient roots principle is applied and the vacuum drops further only in the low pressure range of screw compressors. To enhance operational reliability, the systems can be interconnected in their respective vacuum stages. If a unit drops out, the network is still able to generate the vacuum.

"We must hold this for a good 20 minutes. This completes the process and we

increase the pressure again gradually in the opposite", says Uwe Grosskurth, Key Account Manager for vacuum blowers at AERZEN, describing the process. The finely-tuned processes are crucial to achieving the desired quality. "We don't want to transform scrap into just scrap - but into something viable", says Grosskurth, not forgetting that scrap metal is often the raw material in steel refinement. "We ensure the perfect vacuum - with installations that work in harmony with one other." Perfectly matched means combining and dimensioning compressor and blower in such a way that no assembly runs constantly at the performance limit or gets too hot, while others never leave their partial load range.

A few large assemblies rather than several small ones: For Uwe Grosskurth, the AERZEN strategy creates only benefits for steelworks. "The fewer the machines, the more time, space and money available for the pipework." And where there are no pipes, there is no risk of leaks either. "Every tiny leak impairs efficiency." And then the leaner machine fleet is even more easily integrated into the control and command level, since there are fewer frequency converters for controlling the speed of the drive motors. "Our solutions have the best footprint in the world", emphasises Grosskurth. In terms of operational safety too, less is more. Each assembly saved reduces the outage risk within the mean time between failure (MTBF) calculations.

Outlook

AERZEN estimates that as many as 600 steel refining plants worldwide are still generating their vacuum with steam. "Our customers are very keen convert. Higher energy efficiency and falling maintenance costs simply speak for themselves", says Grosskurth, mentioning return-on-investment times of three to four years as further motivation. "We have over 40 years' experience with steel and iron and the process knowledge we have amassed enables us to effectively support retrofits together with experienced installation manufacturers." ○

AERZEN turbo blower for the simple and efficient supply of activation tanks

Simple and effective: Air as a bearing

Because the air supply to modern wastewater treatment plants is designed for maximum availability, high energy efficiency and long maintenance cycles, AERZEN uses neither oil nor any other lubricant for the motor shaft bearing within the turbo blower – AERZEN simply uses air.

Structure and operating principle of a turbo blower in the current AERZEN series are both simple and effective: An impeller sitting directly on the motor output shaft rotates inside a spiral housing, generating the conveying flow in the process. The flow-optimised impellers rotate in a speed range of between 20,000 and 70,000 revolutions per minute. The high rotating frequency presents three significant challenges for implementation: first, especially high-frequency motors that can even generate these speeds are required. Second, frequency converters rated for these speeds are also needed. And third, the motor shaft must be effectively and reliably mounted with the attached impellor. Standard industrial roller bearings are not suitable in these machines because the speeds are much higher than those roller and ball bearings are able to absorb.

Simple bearing with simple physics ...

As an effective bearing without any mechanical friction at all, AERZEN uses compressed air in the two radial drive shaft bearings and the axial bearing for absorbing the axial forces. This concept never pumps air into the bearing shell at high pressure from the outside, it simply applies the compressor principle. The fast-rotating shaft generates, as the turbo blower is started, an eccentric circular motion in the bearing air gap through natural imbalance. Because, on the minimal distance to the bearing wall, the shaft increases the pressure in this area, counterforce is generated in the form of a pressure rise. This forces the shaft back in the opposite direction, comparable with a compressor or rotary engine. Due to the rapidly increasing speed, the shaft centres itself in the bearing, thereby increasing the pressure in the air gap to over 30 bar. The prevailing force couples are so high that they hold the shaft, even under strongly fluctuating and challenging operating conditions, continuously free-floating in the centre of the bearing.

...versus to complex bearing with high operating costs

Turbo blowers from other manufacturers work with magnetic bearings, which also aim to overcome the high speeds without any mechanical bearing. However, this calls for electric current so that the coils arranged in a ring around the drive shaft can develop their forces during operation and allow the shaft to rotate without mechanical friction. Fluctuating operating conditions especially put the highly complex control system of the magnetic bearing to the test, the result often being technology-

related safety shutdowns of the complete turbo blower.

The control electronics, which have to constantly re-adjust the magnetic field forces, have a limiting effect on the magnetic bearing. For this system to remain active in case of a plant fault, an emergency stop or a power outage, turbo blowers with magnetic bearings must always be equipped with an uninterruptible power supply (UPS). Therefore, sophisticated load cycles are just as necessary as the regular replacement of battery cells within a rigid maintenance plan. The magnetic bearing itself is equally complex, because it continuously uses electrical energy and the complex control system has to be maintained at regular intervals.

Long service life

The air bearing principle requires no electrical, mechanical or pneumatic controls, even with dynamic load cycles. The air bearing also has reserves for absorbing higher speeds than is usually possible with magnetic bearings. Nonetheless, critics complain that when the turbo blower is started, the driven shaft rests on the bearing and develops wear friction until the air cushion is formed. AERZEN counters this theoretical drawback with an innovative air foil bearing with a two-component coating, which includes polytetrafluorethylene. PTFE is a thermoplastic which, due to its very low coefficient of friction, is used as a non-stick coating. "With the PTFE, we produce a kind of lubricating film without oil and grease", explains Steffen Helmert, Product Manager for turbo blowers at AERZEN. A high surface quality is required for this structure to be able to absorb the friction forces that occur in a fraction of a second when

the turbo is started. "The quality depends directly on the production process. Over the many years' of experience with turbo blowers, we have constantly refined the process." In short, AERZEN has effectively found for the new turbo generation a solution that is much simpler and more efficient than the highly-complex magnetic bearing.

But PTFE as a tough bearing material does not create a durable mounting by itself. Because the compressor effect in the bearing compacts the air so densely that the layer between bearing ring and shaft is practically as hard as steel, AERZEN has designed a damping layer specifically for this application. This is a millimetre thick plate which, when rolled into an undulating shape, supports the lubricating layer of the bearing and absorbs vibrations at the same time.

Conclusion

In wastewater technology, turbo blowers are consistently designed for low life-cycle costs. Consequently assemblies such as turbo blowers made by AERZEN are used in processes where long distance solutions are needed. 24/7: As the life-cycle costs comprise to a large extent the energy costs of the assemblies, concerning the energy costs of the turbo blowers available in the market, the question is not whether the impeller is mounted on air or a magnetic field. The real question is which device from which manufacturer is best suited to the application with which performance and consumption ratios. Since the activation process accounts for over 50 percent of the energy consumption of a wastewater treatment plant, it makes sense to include the cost of service and maintenance, as well as the energy costs, in the calculation for the blower design. The pure purchase price of an assembly will fade into insignificance in the future. The best suitable solutions for the general conditions of a wastewater treatment plant are required. It will be the life cycle costs (LCC) which, along with aspects such as standardisation and service availability, that play a greater role in investment decisions. ○

For the bearing system of the motor shaft AERZEN relies on compressed air in the two radial bearings of the drive shaft and in the axial bearing.



Exhibition dates (second half of 2017)

Seminar-Performance³,

Beijing/China 5th/6th July 2017

KZN Industrial Technology Exhibition,

Durban/South Africa 26th until 28th July 2017

EA Water Expo,

Delhi/India 9th until 11th August 2017

Seminar-Performance³,

Guangzhou/China 6th/7th September 2017

IFAT, Johannesburg/South Africa

12th until 14th September 2017

Turbo Show,

Houston/U.S.A. 12th until 14th September 2017

PERUMIN 33,

Arequipa/Peru 18th until 22nd September 2017

WCW, Saskatoon/Canada

19th until 22nd September 2017

T-Plas 2017, Bangkok/Thailand

20th until 23rd September 2017

IMA,

Hamelin/Germany 22nd/23rd September 2017

PowTech, Nuremberg/Germany

26th until 28th September 2017

IFAT 2017,

Mumbai/India 27th until 29th September 2017

WEFTEC, Chicago/U.S.A.

30th September until 4th October 2017

Fenasan,

São Paulo/Brazil 3rd until 5th October 2017

Easy Fairs Solids,

Rotterdam/Netherlands 4th/5th October 2017

PCVExpo,

Moscow/Russia 24th until 27th October 2017

Aquarama-TNAV,

Leuven/Belgium 25th October 2017

Plastic & Rubber Indonesia,

Jakarta/Indonesia 15th until 18th November 2017

WebView can now be easily retrofitted

With the machine control system, AERtronic, AERZEN has been offering the possibility of integrating assemblies into the production interfaces of our customers for a long time. The extension-module WebView provides additional functionality. Furthermore, operating or service data is retrievable at any time and from anywhere in the world unidirectionally. Warning, fault and maintenance messages are sent immediately by e-mail to the person in charge. Therefore, possible failures can be detected and appropriate remedial measures taken at an early stage. The measured values can optionally also be analysed in graphic form for freely configurable periods of time. All process data is safely stored on an integrated SD card. This data can simultaneously be viewed by our customers via intranet or internet for local evaluation.

AERZEN After Sales now offers a retrofit kit so that assemblies manufactured since 2010 can, following a feasibility check, be retrofitted with WebView. This can be done either by your own qualified personnel or by AERZEN service technicians.

The WebView-module of AERtronic is a further step towards sustained process security and Industry 4.0.



New marketing material

For the field of waste water, AERZEN has developed a new planning folder, available in German and English, in both digital and printed form.

With interest in heat recovery systems growing, AERZEN now offers corresponding brochures about application solutions.

We have included the topic "operation without absorption material" in the leaflet portfolio. Customers may inform themselves about discharge silencers without absorption material and oil-free operation according to class 0 in the new brochures ISO standard and safety standards.



The new marketing material can be found, as always, on our CustomerNet:

www.aerzen.com/customernet

AERZEN has been (re)certified six times

At the end of January, DNV GL completed an audit of the integrated management system of AERZEN. For ISO 9001 (Quality), a recertification was due, and for the remaining three management standards - ISO 14001 (Environment), ISO 50001 (Energy) and OHSAS 18001 (Occupational Health and Safety) - a monitoring audit was due.

Furthermore, at the beginning of February, AREVA performed the NSQ-100 audit (Quality Management for Machines in Nuclear Applications) and certified AERZEN at a high level.

In December 2016, Aerzen Belgium NV was certified for the first time by DNV GL according to ISO 9001:2015. The certification covered the following divisions - sales, production, installation, maintenance and repair of AERZEN blowers, compressors, and gas meters.

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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

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As decentral unit the AERZEN Delta Blower provides the conveying air for the Siloadmaxx system.



In its container frame, the AERZEN blower solution suits the standard loading area of trucks.

Pneumatic material transport with positive displacement blowers from AERZEN

Simply blow into the container

Siloadmaxx, the equipment manufacturer, has developed a revolutionary method for loading silo materials into ISO containers in a dust-tight condition. For loading and unloading the containers, the Rhineland-Palatinate company now relies on blower technology from AERZEN.

On short to medium distance transport routes in particular, silo trucks are a tried and tested means of moving dusts, powders and granulates onto the road - and hence into the logistics chain. For longer journeys, the silo is integrated into the frame of a maritime container on board a cargo ship. The disadvantage of such proprietary container/silo solutions, however, is that they have to be returned to the plant empty once unloaded. The freight costs are correspondingly high. Siloadmaxx from Hilgert in Rhineland-Palatinate has developed a patented technology that has what it takes to revolutionise an entire logistics sector.

"The standard maritime container is the cheapest transport medium in the world. Containers are generally hired from the shipping companies and, once unloaded in the receiving port, are simply returned", explains Christian Hanses, Managing Director of Siloadmaxx. "A pressure vessel, on the other hand, always belongs to someone or other". While the transport outer packaging - the standard container - simply remains in the destination port, the pressure vessel delivered full to China must be returned to the sender. This efficiency loss in the logistics chain led to the notion of rethinking silo technology and integrating it into the maritime container in a highly-effective manner.

Perfect freight protection

The aim of the development was to be able to utilise the container load volume up to the roof - without big bags, special boxes or bags on pallets that are difficult to fill. Instead, a tear-proof liner bag which, during loading, clings to the container wall like a second skin to protect the freight from contamination and moisture, is used inside the standard container. In this space, hermetically sealed against the

container wall, a telescopic loading lance then blows in the product. "To do this, we need just under half an hour for a 20-foot container and one hour for the 40-footer and high-cube containers", reports the managing director. The Delta Blower packages from AERZEN deliver a conveying flow of up to 1000 cubic metres per hour and transport the material dispensed via a rotary feeder into the container at a speed of up to 35 metres per second.

Blower integrated in the control system

Due to the different materials with varying densities, chemical properties and specific weights, a blowing technology that can be precisely adapted to the correct volume and pressure via the PLC of the loading unit is required for loading standard containers. Siloadmaxx uses AERZEN blower assemblies that can be decentrally set up and, thanks to a frequency converters, precisely controlled. The ready-to-connect positive displacement blowers supply conveying flows of between 624 and 1452 cubic metres per hour, at differential pressures of between 50 and 1000 millibars.

For unloading at the customer, Siloadmaxx likewise relies on compressed air and AERZEN blowers. This has to make the densely compacted product free-flowing again.

Typical products are cement, soot, silica sand or plastic intermediates such as polyvinyl butyral (PVB) - a substance used, for example, as a hot melt adhesive in the form of intermediate films for laminated safety glass. Given the tough quality requirements in the automotive industry, the material must be completely free of impurities.

Effective explosion protection

Aside the pure pneumatic key data, Siloadmaxx's decision to go for AERZEN

blowing technology was also because the Delta Blower series have spark arrestors integrated into their design. This feature is extremely important to safety, because dusts from plastic or pure carbon, such as soot, always carry a high explosion potential and consequently an ATEX classification. "Therefore, the liner bags are equipped with electrical arrestors that prevent electrostatic discharge from the friction of the dust particles. But this doesn't help much if the blower sends sparks through the conductor in case of malfunction, explains the managing director. Theoretically, there is a risk of sparking whenever the rotary pistons on the Delta Blower or the rotors of a screw type compressor (Delta Screw) touch, during a bearing rupture for example. The AERZEN sound absorbers, which are designed specifically as resonators (absorption-agent free), reliably stop and extinguish these sparks. "The AERZEN base support as spark extinguisher is TÜV certified. That impressed us yet again."

Highly-promising prospects for the future

The high degree of transport safety and the sharp drop in cargo losses saves costs all along the line. According to the company, these savings are in the order of millions. The transport costs per unit are just a tenth. He sees a successful future for the newly conceived loading and unloading technology with blower air from AERZEN. "It's been win-win for us along the entire logistics - we are convinced that future generations will consider our system the standard", says Hanses. ○