



AERZEN

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Excessive plant pressure or insufficient maintenance can have a negative effect on the energy balance of a positive displacement blower and consequently of a sewage plant.



Everything Depends on Pressure And Maintenance

Energy and cost efficiency of biological treatment plants

Every biologically working sewage plant needs a compressed air station for the oxygen supply of the aeration basin. This station only works at the highest possible energy efficiency level if excessive plant pressure through the subordinated system, excessive intake temperatures due to insufficient aeration and deaeration, and increased operating hours due to insufficient maintenance, are excluded. The following examples show that these criteria can have a positive or negative effect on the energy balance of a blower.

Increased plant pressure

Prior to delivery, each blower is set to a predefined pressure. The air compressed to this pressure is mostly channelled via a closed circular pipe with several stubs to the airstones installed in the basin. Incorrectly triggered diaphragm control valves at the entry of the basin can lead to increased pressure in the supply system. Then the compressors have to run against this pressure, which leads to higher energy expenditure and thus to extra costs. Another criterion: the slide valves are triggered via maintaining a constant pressure. The supply pipes are closed automatically as soon as the required oxygen content in the basin has been achieved. Frequency controlled blowers are shut down with a certain delay. In case of a too lengthy delay, first of all the blowers continue running at full load against the closed, or partly closed, slide valves. Air has to escape via the pressure

valves, which may lead to air losses and in the worst case scenario to damage of the blower stages.

The back pressure can also increase when the airstones in the basin become aged due to the presence of chemical components in the waste water, or the pipings and/or airstones get clogged up over time, for example with detached adsorption material from the blower silencers.

For Aerzen positive displacement blowers built since 1995, as well as Aerzen rotary lobe compressors of the new Delta Hybrid series, this risk does not exist. Here, the base support is formed as a pulsation silencer, with noise reduction achieved by means of air deflections instead of via adsorption material. Examples show that a pressure increase of 50 mbar may result in additional energy expenditure, depending on blower design, of between 5 and 10 per cent, and consequently in extra costs

potentially amounting to several thousand Euros.

Increased intake temperature

As the air for compression and cooling of a blower comes mostly from the installation room, the room temperature also has an influence on the energy balance of the plant. When there is an increase in the room temperature in the installation room the temperature of the air to be compressed also increases. This not only leads to an increased temperature of the compressed air and consequently to a reduced oxygen volume in the compressed air, but also to a lower degree of filling and to inferior cooling of the compressors. The consequence is that: the compressor will take longer to convey the required oxygen volume. Excessive room temperature can occur in the following situations: (1) if the aeration and deaeration orifices are incorrectly positioned or are too small; (2) if the airflow is not supported by thermostatically-controlled fans or if their capacity is insufficient; (3) if the roof of the compressor room is insufficiently protected against solar radiation; (4) if the compressed air pipes inside the station are not isolated or else are insufficiently isolated.

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Dear Readers,

Constantly rising energy costs are pushing the need to reduce energy consumption ever more to the forefront. It is mandatory always to check and optimise various production processes. Besides compressors, pumps are among the most energy-intensive working machines and this results in high operating costs. Therefore, these machines have considerable potential for savings to be made.

We face the challenge of setting standards with regard to newly developed compressors and machine concepts, in order to fulfil all current and future requirements. The development of highly energy-efficient compressors is one of the key objectives in our vision 2020.

Our aim is not only to support and push ahead with the development of energy-saving machine technology, but also to reduce the life-cycle costs of existing plants thanks to the adoption of intelligent concepts. This edition looks at preventive machine monitoring and the importance of continuous maintenance, as well as the possibility of reducing operating costs at existing plants by replacing obsolete compressor technology.

And now, please enjoy reading the news from Aerzen!

Yours

Dipl.-Ing. Ingo Kammeyer, Product-manager Aerzener Maschinenfabrik

Nomination for Innovation Award 2013

Aerzen Delta Real Time Monitoring (see article on page 4) was nominated for this year's Innovation Award at the PowTech fair. Ultimately we did not win the award, but just being nominated is quite an achievement in itself, particularly as: The Aerzen product finished in the top three out of 52 competitors. In addition, Delta Real Time Monitoring had been placed, for lack of a suitable alternative, in an inapplicable category, namely MSR and automation.

In 2012 Aerzener Maschinenfabrik was able to win the Innovation Award with Delta Hybrid in the apparatus construction and process components category.



At the PowTech fair Aerzener Maschinenfabrik received a certificate for being nominated for the Innovation Award.

Exhibition dates

In 2013, Aerzener Maschinenfabrik, its sales companies and representatives, will once again participate in fairs and trade exhibitions worldwide of a number of different industries.

DWA Landesverbandstagung Nord, Hildesheim	11th September 2013
Targi, Katowice/Poland	10th–13th September 2013
2. Practical training „Bulk materials”, Dortmund/Germany	17th–18th September 2013
GAT/WAT, Nuremberg/Germany	30th September–2nd October 2013
Sy Mas, Poland	October 2013
Easy Fair Solids, Rotterdam/Netherlands	2nd/3rd October 2013
Weftec, Chicago/USA	5th–9th October 2013
K, Düsseldorf/Germany	16th–23rd October 2013
Aquarama, Belgium,	Autumn 2013
Pollutec, Paris/France	3rd–6th December 2013
Common annual meeting of DWA and BWK, Mainz	7th/8th November 2013
Trade exhibition exchange of experience of masters Lübeck, Lübeck-Travemünde	3rd/4th December 2013
Rohrleitungsforum, Oldenburg	6th/7th February 2014

Aerzen Representation in Nigeria



Emmanuel Dazi is head of the new Lagos office.

Due to the increasing number of customers in West Africa, Airgas Compressors, the South African subsidiary company of Aerzener Maschinenfabrik based in Johannesburg, decided to establish a sales office in Nigeria. The location they have selected is Lagos, the country's biggest city, which, due to its central position, offers access not only to Nigeria but also to all of West Africa, and consequently provides considerable proximity to our customers in this region.

The new office will be headed by Emmanuel Dazi. After having completed a Bachelor's Degree in Mechanical Engineering in Nigeria, and a Master's Degree in Mechanical Engineering at the Brunel University in London, he gained a number of year's experience in the cement industry, where he was responsible for technical support for blowers and compressors.



Besides a positive displacement blower series DELTA BLOWER, which extracts exhaust air and feeds it into the aeration basins, wastewater treatment plant Arnsberg-Wildshausen also has a new Aerzen turbo blower in the central compressed air station.



Wastewater treatment plant Arnsberg-Wildshausen

New Turbo Blower Reduces Costs And Energy Consumption

Having exchanged a 19 year old turbo compressor for a turbo blower of the new "AT Turbo Generation 5" series, the wastewater treatment plant Arnsberg-Wildshausen is now making considerable savings, both in terms of energy and money.

In Arnsberg-Wildshausen Ruhrverband (Essen) operates a biological wastewater treatment plant. It treats the sewage of 48,000 inhabitants and that of a paper factory as well. Air required in the aeration basin is generated in the central air station. Until November 2012 three approximately 19 year old adjustable turbo compressors, which had been connected in series and had been run according to the load-dependent air requirement of the three aeration basins, were in operation there. For normal requirements one unit supplied the required air volume, for higher requirements two units were in use, and during peak times all three units were running.

Replacement instead of expensive maintenance

The waste water from the paper factory has been pre-treated since 2008 and consequently the volume of waste water in the aeration basins has fallen, such that only two turbo blowers are required for the generation of the activation air.

In 2012 one of the three old turbo units in the central station was showing signifi-

cant signs of wear. Therefore, instead of an extensive and very costly refurbishment, it was decided that this old unit should be replaced with a new turbo compressor.



Markus Droppelmann, group manager "Obere Ruhr" at "Ruhrverband" in Essen:

„I saw the new turbo blowers for the first time at IFAT in Munich in 2012. All in all, selecting this as a replacement has provided considerable advantages for us.“

By taking this step they simultaneously wanted to increase the energy efficiency and to improve supply safety in the aeration basins.

As far as their performance data was concerned the new turbo blowers series "AT Turbo Generation 5" were nearly identical with the old unit to be replaced. For this replacement a detailed calculation of profitability showed a potential energy saving of between five and six per cent, so the exchange would pay for

itself within five to eight years. This period shortens further when taking into account the anticipated costs for the fundamental reconstruction or procurement of spare parts for the old unit. Furthermore, with the new unit any problems inherent in the old unit's design no longer exist. In the old units an oil supply of 19.5 litres had been used for lubrication and cooling. At full load operation and with high temperatures in summer, the considerable heating up of the oil often resulted in the unit automatically coming to a standstill, so sufficient air supply to the aeration basins was no longer guaranteed.

Turbo blower as base load unit

As base load unit, the new Aerzen turbo blower supplies 80 per cent of normal requirements on its own. A second old unit is switched on as peak load unit for only five hours each day. "We have been operating the new turbo blower for more than six months, around the clock, as base unit in continuous operation. Up to now it has completely met our expectations", says Markus Droppelmann at Ruhrverband. ○



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As an empirical formula we say that a temperature reduction of 3 per cent leads to an energy saving of 1 per cent. This is the reason why blowers made by Aerzener always suck in air on the "cold" side of the unit and not on the discharge side with the pipe connection, as on this side there is a higher amount of radiated heat.

Maintenance

The energy balance can also be negatively influenced if maintenance is not carried out according to manufacturer's instruc-

tions. A classic example of this is a pressure valve damaged by increased resistance, caused by the above mentioned criteria, or an air filter which was replaced too late.

If, just to save 50 Euros, this air filter is not replaced, but is only disassembled and blown out insufficiently and then reinstalled, the energy consumption of the blower will already increase. A standard value: a reduction of the pressure on the suction side by 10 mbar will reduce energy costs by approximately 1 per cent. A new filter will show a pressure loss of only around 5 mbar, but contaminated filters

can show a pressure loss of more than 30 mbar.

As compressed air stations usually consist of several compressors the extra energy costs can add up quickly. This can be avoided by maintaining all blowers in accordance with instructions, through the service divisions of the manufacturer and/or the operator. After all, the energy costs of a compressor over its service life amount to up to 90 per cent of the total costs of the plant. Only around 10 per cent are attributable to investment and maintenance costs. ○

Aerzen Hungária Kft.

New Assembly Plant Inaugurated

In the company of many guests, the Hungarian subsidiary of Aerzener Maschinenfabrik in Esztergom officially inaugurated the new location of the process-gas-division, which includes a new office building and an attached assembly building, on 12th April 2013.

At the beginning of 2011 it was decided to establish a process gas location in Hungary which would offer, in addition to the necessary engineering facilities, an assembly facility for process gas units and refrigeration compressors. Following that decision the building project was completed with

considerable speed, and staff for the new facility have all come on board.

During the official inauguration ceremony numerous customers, suppliers and partners, as well as a representative from the Economic Division of the German Embassy were present. Klaus-Hasso Heller, Manager of Aerzener Maschinenfabrik, and András Legányi, Manager of Aerzen

Hungária, cut the ribbon and then welcomed their guests.

Afterwards, everyone enjoyed a buffet, live music and various shows. In numerous conversations the efficiency of the new location was mentioned – something which is apparent from the types of projects which it is now capable of handling. ○



A toast to the new building and the new location of the process gas division.



Investments at Aerzen head office

Everything Will Be New By May 2014

As part of its factory planning, Aerzener Maschinenfabrik decided to construct both a new administration building and a new logistics centre.

The new administration building, with a usable area of approximately 2,000 square metres, and a foyer designed as an atrium, was ready for occupation in June.

New administration building

Contrary to what had originally been planned, the old administration building will not be renovated but will instead be demolished. In its place another building will be constructed which will blend

with the modern architectural picture. In this second construction stage, which should be completed in Spring 2014, about 1,500 square metres of usable space will be created over three floors. This will address the considerable growth of the Aerzen group of companies.

New logistics centre

In order to adapt and improve Aerzen's logistical processes so that they can cope with ever increasing requirements, a func-

tionally and visually appealing logistics centre will be built on a base area of about 6,500 square metres. In this factory building there will be room for oil storage, office space, trade fair machinery, social spaces and the necessary energy and media supply.

Completion is envisaged for May 2014 and it is intended that the company's 150th anniversary celebration, which will take place on 22nd May 2014, will be held in this new facility.

Further plans over the medium term include the construction of a new high-bay storage facility and also a new After Sales Centre. ○



The new logistics centre in Aerzen is scheduled for completion in Spring 2014.



Delta Screw G5-series expands

In April, at this year's COMVAC in Hanover and at the POWTECH in Nuremberg, Aerzener Maschinenfabrik successfully introduced

the new "E-class" directly-coupled compressors series Delta Screw G5. The new, highly energy efficient concept met with a positive response from customers and potential buyers.

With the new series, Aerzener Maschinenfabrik sets new benchmarks as far as reliability and energy-saving is concerned in oil-free screw compressors.

From Summer 2013 the first two compressor types, VM 45 G5-E and VML 60 G5-E, can be ordered from Aerzen. By the end of this year, two more models, the VM 75 G5-E and the VML 95 G5-E, will join the new Aerzen "E-class". A flyer which describes the innovations, including all of their technical details, can be obtained from the Marketing division.

The new „E-class“ directly-coupled Aerzen compressors

Aerzen Canada celebrates 25 Years

The Canadian Aerzen subsidiary Aerzen Canada Inc., located in Vaudreuil near Montréal, will celebrate its 25th anniversary this year. The company, which was founded in 1987, has developed over the years from a sales office with three employees to a country-wide networked sales company which also has facilities for assembly and repair.



The colleagues of the sales company in front of the head office.

New CNC-external Cylindrical Grinding Machine

The production facility in Aerzen deployed a new CNC-external cylindrical grinding machine, made by Messrs. Danobat, at the beginning of the year. It is equipped with three CNC-main axes (X, Z, B) as well as further axes for the workpiece drive, and an "in-process measuring system" through which it is possible to grind to micrometre accuracy. The control of the machine, Siemens 840 D Solution Line, was supplemented by a special Danobat user interface. Danobat, located in the north of Spain, near Bilbao, is part of the Danobat Group, and also demonstrates its considerable skill in innovation, in other technologies.

The new Danobat machine grinds compressor rotors to micrometre accuracy.



Aerzen Turbo strengthens Customer Support

Since April of this year the arrival of Steffen Helmert has strengthened the Aerzen Turbo-Team in its Technical Support and Customer Service area. Due to his previous roles at the subsidiary RKR he has many years of professional experience and special expertise in the Turbo Blowers range.



Steffen Helmert

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

We are looking forward to your feedback.

Aerzen Sales Office in Norway

Since January, Aerzener Maschinenfabrik has had its own sales office in Norway. The office, headed by Ove Fauskanger, is located in Drammen, in the southwest of Oslo, and is thus close to several big chemical companies such as Ineos, Hydro and Borealis. Besides the chemical industry, the offshore industry - or more precisely "fish farming" - plays a major role in Norway. Salmon is the country's second most exported product. Aerzen blowers are used for example in the pneumatic conveying of feed pellets.



Ove Fauskanger



Aerzen U.S.A. selected as the "Coolest Building"

In March, Key Stone Edge Magazine selected the Aerzen U.S.A. building in Coatesville as one of the five "coolest" buildings in Pennsylvania.

In 2009, the "green" building of our American subsidiary which they had moved into in 2008, was awarded LEED Gold (Leadership in Energy and Environmental Design) for its sustainability by the U.S. Green Building Council. Now they have received another award from a weekly online magazine in Pennsylvania. A decisive factor for the jury was the materials used in the building's construction, i.e. straw bales and loam, which are reasonably priced but provide good insulation. Our American headquarters is the first commercial building in Pennsylvania with straw walls.

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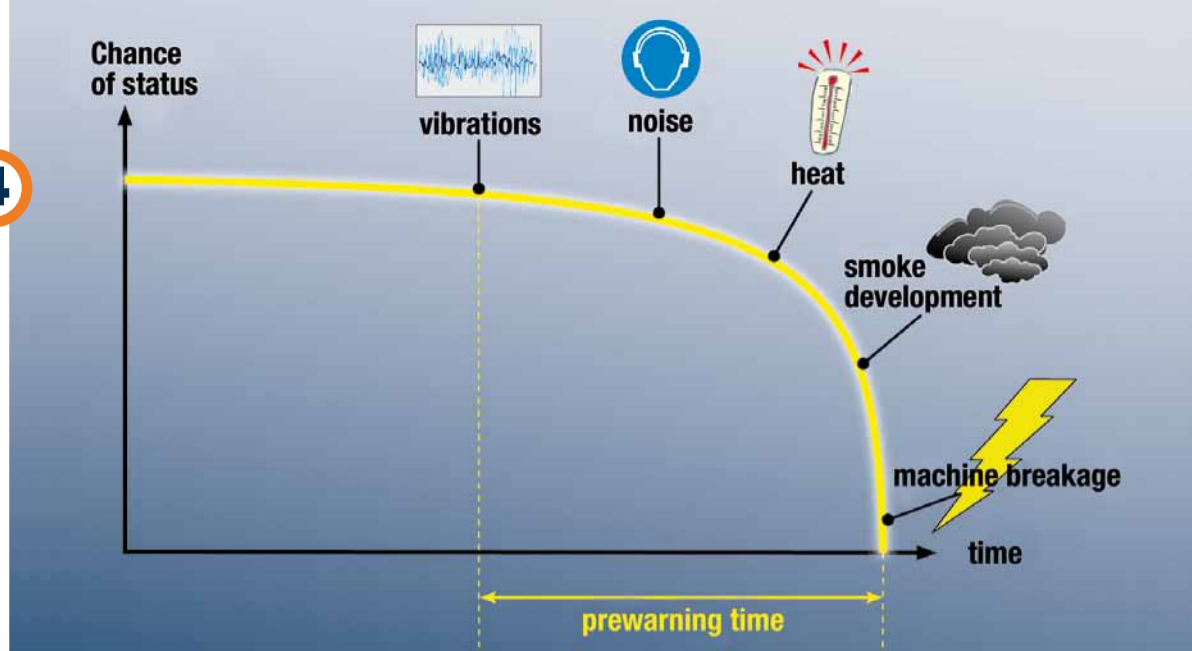
Editorial staff
M/Stephan Brand (v.i.S.d.P.)
Andreas Gattermann, Frank Glöckner,
Klaus Grote, Klaus Heller, Ingo Kammeyer,
Rainer Lübbecke, Bernd Wöhlken

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AERZEN



In Aerzen all the measured values are collected and checked.



Delta Real Time Monitoring

Aerzen Offers Plant Monitoring in Real Time

Following extensive field tests, Aerzener Maschinenfabrik can now offer its permanent machine monitoring system "Delta Real Time Monitoring" for the entire delivery programme. With this real time system, which provides a very high level of security, Aerzen is able to satisfy requests from plant operators for high-quality process sequences.

If the vibrations from a twin-shaft machine exceed the stipulated limit values this can signal a technical problem or the need for a repair or an overhaul. If such indicators are recognised early enough, preventive maintenance work can be scheduled and unexpected breakdowns, serious damages and high downtime costs can be avoided to the largest possible extent.

This is exactly what "Delta Real Time Monitoring" achieves. It can be integrated into each new Aerzen unit, and can also be retrofitted.

The system monitors vibrations, the pressure and the temperature of the ma-

chine via sensors, and it can also integrate the Aerzen AERtronic-control system. All of the measured values of up to eight diagnostic units are merged in real time in an independent switch cabinet and these are transmitted immediately via internet, ethernet or GSM-modem to a special server at Aerzener Maschinenfabrik. There, all this data is stored and it can be retrieved at any time. Upon request, the operator can receive a visual display of the data in the central control room. At least once a week the Aerzen service department checks the condition of the machine and, according to the terms of the contract, prepares a report about the condition of the unit on

a monthly, quarterly, half-yearly or annual basis. If so required, they will also prepare and submit optimisation proposals for safe and trouble-free operation.

If limit values are exceeded, information is generated automatically via SMS or e-mail, so that any necessary further steps can be taken, such as shutdown, limited operation of the plant or the deployment of an Aerzen technician. For the installation of the hardware and the monitoring service for three years a monthly fee is payable; after that, only a reduced service fee is payable. Costs incurred beyond the normal warranty due to maintenance or the need for spare parts are invoiced separately. ○

Applications in the steel industry

Steel Degassing With Aerzen Vacuum Blowers

During the production of high-quality steels Aerzen Vacuum Blowers are used for further processing of the melt, the so-called steel degassing.

Vacuum Blowers are used after the so-called "refresh" of the steel, where oxygen is blasted into the pig iron. During this metallurgic further processing of the melt, the so-called secondary metallurgy, gases are removed, including argon, carbon monoxide, oxygen and carbon dioxide, which can negatively influence the properties of the steel. Aerzen Vacuum Blowers ensure safe suction of these harmful gases under vacuum conditions.

Different procedures in the secondary metallurgy are used for steel production with dry compressing Aerzen Vacuum Blowers.

RH- (=Ruhrstahl-Heraeus) and RH-OB-procedure (=Ruhrstahl-Heraeus-Oxygen-Blowing)

In the so-called vacuum circulation procedure, a partial quantity of the liquid steel is sucked into a vacuum vessel. This is effected via two pipes on the under side of the reservoir dipping from above into the melt. The reservoir is evacuated and the melt rises up via both channels. Argon

is continuously blasted in so that the melt is decarbonized (carbon is removed) and degassed, and afterwards it flows back into the melt pan. The purpose of these operations is to produce steel with greater purity. Due to the removal of hydrogen the hydrogen brittleness is reduced. The first Rh-treatment of steel was carried out in the steel works of Henrichshütte in June 1958. Later, the Rh-OB-procedure (Rh-Oxygen Blowing) was refined whereby the degassed melt is decarbonized by additional blown-in oxygen thereby producing steels of higher-quality.

VD (= Vacuum Degassing) and VOD-Procedure (= Vacuum Oxygen Decarburisation)

Aerzener Maschinenfabrik has been well-represented in these applications for over 60 years with the large Roots Blowers. Energy saving and an improvement in the environmental balance are the main focus worldwide. Applications for production of vacuum with dry-compressing vacuum blowers are divided into three areas:



Aerzen vacuum blower series HV in a steel works.

1. New installations for higher steel qualities.
2. Modernisation of existing large-scale units in substitution for steam cleaners.
3. New installations for smaller steel works producing new semi-finished products out of steel scrap (mini mills, micro mills).

The reliability of Aerzen large blowers with a suction volume of 10,000 to 97,000 cubic metres per hour, and the technical support available, are appreciated worldwide. For smaller volume flows (mini mills or micro mills) and quick processes, Aerzen Canned Motor Blowers are also used including the GM 9500 HM-Y with suction volume of up to 15,600 cubic metres per hour. As usual, Aerzener Maschinenfabrik has the right solution for each type of application. ○