



AERZEN COM·PRESS

Process air applications AERZEN solutions for the heat recovery



Vacuum generation Tobacco group JTI relies on AERZEN Delta Screw



Wastewater treatment plant Reference project Aachen-Soers



Dear Readers,



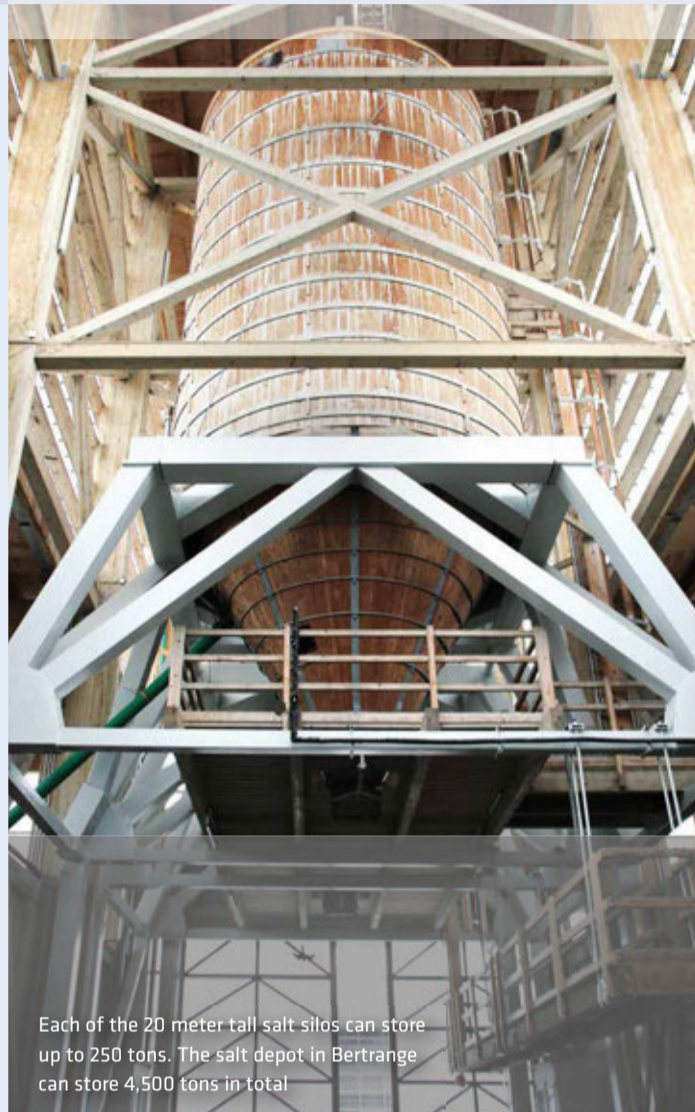
Sebastian Meißler, Marketing

“Help the customer to be successful!” True to this motto, AERZEN focuses on its customers and their requirements, in order to find the most economical and long-term future-oriented process air solution for them. The path to becoming an application specialist is in line with the AERZEN corporate philosophy, which focuses employees and processes on developing solutions for its customers in numerous applications, and for special application profiles. With interesting contributions from the fields of wastewater treatment and pneumatic conveying, in this issue you will gain an insight into the world of customer applications. The potential savings which can be achieved through the use of heat recovery solutions not only bring ecological benefits, but are also increasingly important economically due to the continuous rise in energy costs and the demand for more efficient use of resources. AERZEN offers its customers efficient bespoke systems for the effective introduction of available energy into production processes, hot water preparation or heating systems. What do you think? How much savings potential is there in your process air solution? Make use of our know-how - we will be pleased to advise you!

Cordially yours,

S. Meißler

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Each of the 20 meter tall salt silos can store up to 250 tons. The salt depot in Bertrange can store 4,500 tons in total



Mobile salt conveyor system in Luxembourg with an AERZEN GM 355 positive displacement blower. A mobile solution was necessary because it was not permitted to change the appearance of the warehouse.



The AERZEN Delta Blower generation 5 is responsible for the pneumatic transport of salt into 20 meter tall silos.

Salt mobilises

Pneumatic transport of salt with AERZEN technology.

AERZEN is one of the leading manufacturers of positive displacement blowers and screw compressors. The global player teamed up with the company Emde Automation GmbH to deliver a conveyor system for salt to the road construction administration of Luxembourg that will not run out of air anytime soon.

It says NaCl in big red letters in the front of the building: Sodium Chloride - and the building contains what it advertises. 4,500 tons are stored here at peak times.

The salt that is waiting to be put to use in Bertrange, a town to the west of the city of Luxembourg, is responsible for keeping the 3,960,000 m² of highways of the Grand Duchy of Luxembourg free of ice and snow during the cold season. “To make the salt adhere better to the roads, and to achieve the optimal thawing effect, we use a self-produced salt solution containing 22% salt,” says Pierre Servais from the road construction administration of Luxembourg (Administration des ponts et chaussées), which is responsible for the construction and maintenance of public roads.

The salt solution is produced directly at the salt depot in Bertrange from rock salt with a purity of at least 98 percent. Because without salt, winter service would not be possible. So every year, before the cold snap begins, the depot is restocked in

good time. The precious commodity is delivered by trucks and is unloaded in front of the depot. But how do all of these millions of salt grains get into the 20 metre tall salt silos? For about a year, this has been made possible by a positive displacement blower GM 355 (max. 2,418m³/h, 1 bar differential pressure) produced by AERZEN, which is part of the globally successful Delta Blower series. Numerous processes are powered by the versatile compact assemblies. Especially for pneumatic transportation of bulk material - like the salt in Luxembourg for example - the belt driven blowers with rotors are first choice. These work highly efficiently, are oil-free as per class 0, and thanks to patented discharge silencers without any absorption material, are also ATEX certified.

Beauty has its price

When the old salt conveyor system in Luxembourg failed, immediate support was of the essence. “In winter service we

just cannot afford the failure of one of our facilities,” says technical manager Servais. AERZEN helped on the spot and delivered a rental package within 24 hours. “We were convinced by the immediate service and the great performance of the machine.” Because of this, the contract to replace the faulty system was also placed with the Lower Saxony machine manufacturer. Christoph Winter, sales engineer at AERZEN explains: “The old machines were located inside the warehouse where the salt was stored. So it was immediately obvious to us that the system had to be moved out of the salty atmosphere. The reason being that salt is highly corrosive and puts a lot of stress on the equipment. This results in premature corrosion and a short lifespan.”

Plenty of space was available for permanent installation of the blower equipment in front of the warehouse, but it turned out that any changes to the appearance of the building were not allowed. The reason for this was that the building was designed by the Luxembourg firm Bruck + Weckerle and its transparent Prokulit light panels have been awarded multiple times: in 2007 the design won the ‘Luxembourg architecture award’ (Prix Luxembourgeois d’Architecture), followed, in 2008, by the ‘Bauhäpreis.’ The solution: the





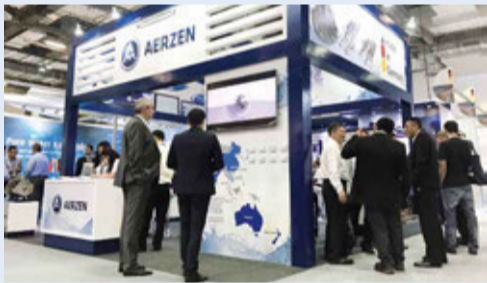
Chuck Lim, Vice President AERZEN Asia Pacific, and Dr. Ulrich A. Sante, German Ambassador in Singapore, at the AERZEN stand at the Singapore International Water Week

Aerzen Asia at the SIWW in Singapore

Aerzen Asia participated in the Singapore International Water Week (SIWW) with its own stand from 9-11 July 2018. This trade fair takes place every two years and is the most important exhibition of its kind in South East Asia. The exhibition brought together visitors and exhibitors from the water management industry from all parts of Asia.

Aerzen Asia used the SIWW as a platform to further develop regional developing markets such as China and India. The company presented the products Aerzen AT200 G5^{plus}, Delta Hybrid D12S and AERsmart, as well as our after sales services, at an exhibition stand covering more than 50 square meters. Also, the German Ambassador in Singapore, Dr. Ulrich A. Sante, was welcomed at the stand and was informed about the solutions and the history of AERZEN by Chuck Lim, Vice President Aerzen Asia Pacific.

The three trade fair days of SIWW were very positive for AERZEN's brand awareness and have confirmed the position of our company as a leader in the wastewater and environmental market.



Aerzen Argentina: Partnership with Bioingepro

Following intensive discussions, Aerzen Argentina has agreed to cooperate with Bioingepro S.R.L., one of the country's largest manufacturers of wastewater treatment plants. The Buenos Aires-based company has already built over 450 wastewater treatment plants. Therefore, it makes Aerzen Argentina proud that Bioingepro relies on our portfolio and our technologies. Gastón Jares of Bioingepro says: "We are happy to cooperate with a company like AERZEN. We share the same values, including the constant pursuit of progress and the most modern and sustainable technologies to protect our most precious asset: water." The first two units have already been supplied by Aerzen Argentina.

The first units for Bioingepro



Inside the inlet funnel a rotary valve distributor takes care of the dosage of the salt and the constant throughput. Emde flow-optimised the product inlet.

AERZEN blower was mounted on a heavy-duty trailer so that it can be moved and connected to the plant as and when required.

In order that the appearance of the warehouse is not impaired the assembly can be stored away in summer. In winter it is set up by the use of a fork lift truck. As soon as the trucks unload the salt, it is picked up by wheel loader and dropped into a funnel. It then passes through a rotary valve distributor, which takes care of the right dosage and a constant throughput, and ends up in the product inlet. From there, it is transported with a pressure of 0.4 to 0.5 bar (maximum of 0.63 bar) and a flow rate of 1,920 m³/h in pipe systems up to lofty heights by AERZEN technology. In total, two silos with a holding capacity of 250 tons each have to be filled.

Team work makes the dream work

For the construction of the trailer, as well as the piping, Emde Automation GmbH from Nassau, a company that AERZEN



Pierre Servais (technical manager of the road construction administration in Bertrange), Christoph Winter (sales engineer at AERZEN) and Björn Redert (project manager at Emde)

has worked with for more than ten years, was brought on board. "We recalculated and reinterpreted the product-to-air-ratio inside the pipes and flow-optimised the product inlet," explains Björn Redert, project manager in the sales department at Emde. "The challenge was to recycle and integrate existing components of the old facility made by our competitor into the new concept." On top of this, Emde applied protection against wear in some parts of the piping system. This became necessary as the walls of some of the pipes had become thinner due to the friction caused by the salt transportation process. "The cooperation with AERZEN has again been a great pleasure," says Redert. "It just works - from preparation of quotations to the support and the service. And the quality is also spot-on."

Pierre Servais is also completely satisfied: "It was the right decision to put the blower outside. The system performs significantly better now." To the Luxembourg, one aspect is particularly impor-



The salt that is stored in Bertrange is used to de-ice a part of the highway network in Luxembourg during the cold season.

tant: reliability. "We need a plant that we can depend on. Because in winter we need to be ready for operation at all times. In AERZEN we have found a reliable partner that provides us with products that are long-lasting and which require little maintenance, as well as competent consulting and comprehensive customer service."

It is beyond all question that this successful cooperation will continue. The first follow-up project is already a done deal. Because just a few weeks ago the second conveyor system for salt in Bertrange also failed. Competitor products were also used here. The details have already been discussed, soon another AERZEN blower will be delivered to Luxembourg.

More informations:

- <https://www.aerzen.com/de/produkt/geblaese-aggregate-delta-blower-generation-5.html>
- <http://www.pch.public.lu>

For pneumatics and other fields of application

AERtronic Master: Overriding master control made by AERZEN

The AERtronic Master is a blower and compressor master control for up to 12 machines (each with AERtronic), which is particularly well-suited for use in pneumatics and other fields of application.

The AERtronic Master is a cost-effective alternative to AERsmart. Thanks to the AERtronic Master, it is possible to improve the overall efficiency of the plant, and to make the utilisation of the individual machines more homogeneous. In addition, the AERtronic Master offers the option of graphically displaying the operating status of the machines and sending the data to the customer's control room in compressed form. The connection is made via the RS485 Modbus, or alternatively with an expansion module via Profibus.

The features of the AERtronic Master at a glance:

The overriding blower and compressor control AERtronic Master can be used for up to twelve machines.



- Innovative control system for speed-controlled and unregulated compressors and blowers
- Consumption-dependent connection/disconnection of compressors, offering energy savings potential of up to 30 percent
- Additional cost savings through optimised compressor running times and optimum adjustment of maintenance intervals
- Fast and easy commissioning
- 4.3 inch colour display with touch function
- The display provides the most important information about the entire compressed air station at a glance. Additional data can be retrieved at any time.
 - Operating conditions of the connected compressors
 - Graphic display: progression curve over time for network pressure

AERZEN control systems - comparison table

	AERtronic	AERtronic Master	AERsmart
Local control system	X	0	0
Overriding master control	0	X	X
Cost efficiency via map analysis	0	0	X
Regulation for maximising the overall energy efficiency of the plant	0	0	X
Regulation for optimum coverage of the required system pressure	0	X	X
Available for all Delta series from AERZEN	X	X	X
Integration of third-party assemblies	0	0	X
Extension by Profibus interface	X	X	X
Extension by WebView	X	0	X

Investments pay off quickly: AERZEN offers solutions for retrofitting

A hot subject: Heat recovery in process air generation

In process air applications, operators can really work up a sweat, because compressed air generation is by far the most expensive form of energy for physical reasons. Following the laws of thermodynamics, there is no compressed air without heat. In view of the long operating times of compressors, it is particularly important to recover these costs for two reasons, first for environmental reasons, and then still because of business management reasons. Appropriate solutions for new construction and retrofitting are now an integral part of the AERZEN portfolio.

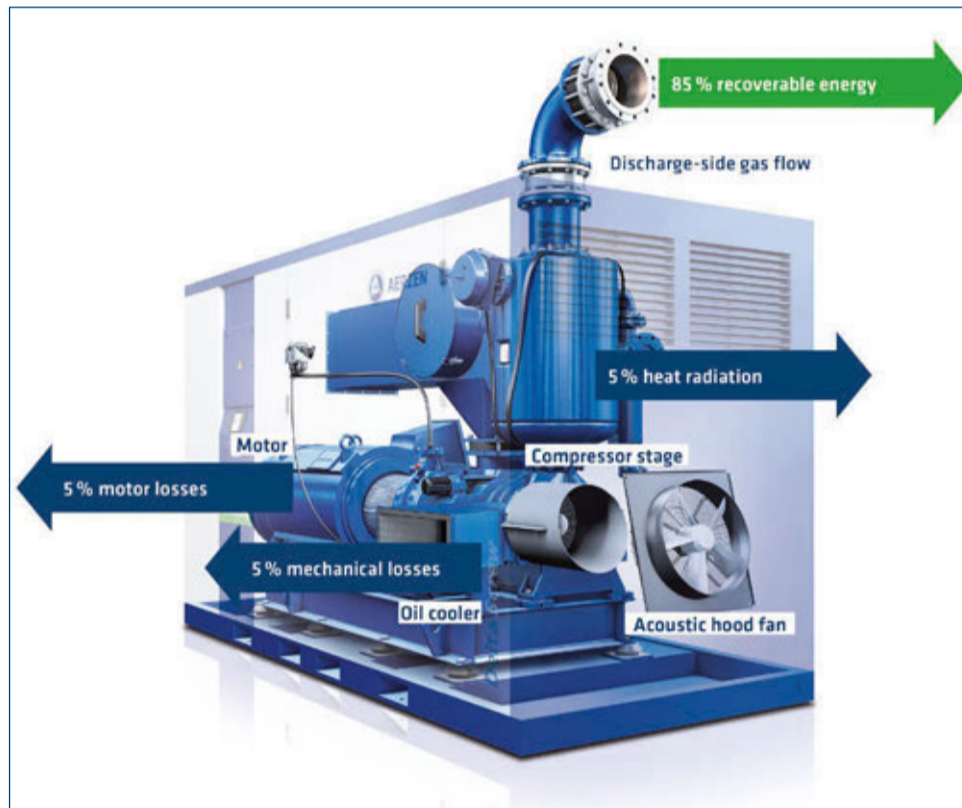
Compressed air is a hot topic from an energetic point of view. Limited resources, strict environmental regulations, limited CO₂ emissions, rising energy costs and increasing price pressure are the driving forces behind energy efficiency projects. On the one hand, this is based on precise design, so that systems can operate around the clock and closest to the optimum operating point, but also due to the use of frequency inverters for speed control. On the other hand, for physical reasons, compressors offer an enormous potential to utilise the inevitably rising air temperature during pressure increase. In view of the growing interest in ecological sustainability and economic cost awareness, plant operators are increasingly looking on heat recovery.

Laws of Thermodynamics

According to the laws of thermodynamics, air, in an enclosed space, heats up as soon as pressure rises. The reason for this is that air molecules must move closer together due to smaller space and, thus, friction increases. For further analysis, the law of ideal gases is applied for the typical range of process air pressures. Together with the efficiency of the compressor at the respective operating point, the air temperature can be calculated downstream of compression. This mainly depends on the pressure ratio. At an intake temperature of 20°C, a pressure ratio of three, and an isentropic compressor efficiency of 74 percent, the air is heated to approx. 166°C during compression. The higher the temperature, the wider the range of applications for waste heat recovery. The amount of heat contained in the process air typically accounts for about 85 percent of the total amount of heat potentially to be recovered in plants. The remaining 15 percent are distributed more or less equally between losses from the drive motor, the mechanics and radiation from the hot compressor stage underneath the acoustic hood.

Waste heat for heating rooms

But these 15 percent can also be used for heating adjacent office areas, or production areas within heat recovery measures. AERZEN equips the exhaust air louvers of the positive displacement blower Delta Blower, rotary lobe compressor Delta Hybrid and screw compressor Delta Screw with an exhaust air duct. The heated air, which previously cooled the compressor stage, the silencer, and the piping system underneath the acoustic hood, escapes from this exhaust air duct.



The amount of heat contained in the process air typically accounts for about 85 percent of the total amount of heat potentially to be recovered in plants. AERZEN offers heat recovery solutions for the respective application, which effectively channel the available energy into production processes, hot water preparation or heating systems.

The return flow in the central exhaust air duct, from which branching air ducts supply the rooms to be heated, has a temperature between 30°C and 60°C. Regulated flaps are used in this system for individual temperature control.

Compact pipe bundle heat exchangers

The first way of heat recovery is to exploit the 85 percent share of thermal energy, i.e. concerning the compressor air itself. AERZEN already successfully uses flow-optimised pipe bundle heat exchangers for a large number of applications. These compact units are located just downstream of the assembly on discharge side. The installation is simple. Consequently, this technology is also recommended for retrofitting, in order to noticeably improve the energy efficiency of existing plants, and the CO₂ balance. The pipe bundle heat exchangers used by AERZEN are designed in such a way that the performance loss due to the increasing duct pressure of less than 2-3%, depending on applications and requirements, is negligible.

While the thermal energy from the pure exhaust air can be used most effectively for direct room heating, the use of pipe bundle heat exchangers opens up an energy source with significantly higher temperatures. This results in a multitude of application possibilities in the implementation. Typical applications are the support of heating systems, the preparation of hot water for showers and washrooms, as well as the heating of service water in industrial environments. In wastewater technology, the heat can also be used to dry sewage sludge. When planning such systems, it must be ensured that they are dimensioned to match the base load.

The basis for optimum waste heat utilisation is the determination of the usable amount of heat. Of course, it depends on the usable temperature difference, the prevailing volume flow, and the degree of simultaneity of supply and use. AERZEN offers smart heat recovery solutions for the respective application, which effectively channel the available energy into production processes, hot water preparation or heating systems.

Summary

Compressed air generation is automatically connected to waste heat due to thermodynamics. Since this law cannot be repealed, solutions are needed to integrate the previously unused heat into the own energy demand. It must be noted that the real extent of possible savings is often not recognised by the plant operator in its entirety. However, a look into practice shows that this technology pays for itself quickly, plus reducing CO₂ emissions.

AERZEN's aftercoolers set standards

With minimum pressure losses and extremely high cooler inlet temperatures, all AERZEN aftercoolers are suitable for cooling air and nitrogen up to 280 °C! Developed in cooperation with well-known international manufacturers, AERZEN offers a complete range of air-air and water-air aftercoolers. The independent series is specially tailored to the machine types Delta Screw, Delta Hybrid and Delta Blower, including downstream cyclone separator and condensate drain. Furthermore, an extensive range of accessories is available.

AERZEN has its own design programs. In just a few minutes, a suitable cooler can be selected and its process data calculated in a customer-specific manner – to achieve the most efficient solution for each temperature-critical subsequent process.

Key features of the air-air aftercooler in special:

- Already available as standard: aluminium cooler, motor, motor bracket, fan box, protective grid, fan
- Numerous options: special varnish, special coating, special motors for fan, cyclone separator and condensate drain
- An AERZEN Highlight: speed control of the fan at specified air discharge temperature (optional)
- From 250 °C with integrated stainless steel pre-cooler



Perfectly designed – AERZEN's air-air aftercooler

Characteristics of the water-air aftercooler:

- Functional principle: compressed medium flows through the cooler pipes, cooling water rinses the pipes in a counterflow
- Applicable also for heat recovery
- Developed for smallest pressure losses
- Variants: fixed installed or detachable pipe bundles, smooth or ribbed pipes, made of stainless steel at high gas temperatures, made of copper nickel in case of seawater. By the way: ribbed pipes increase the pressure loss compared with smooth pipes, but, they have a better heat transfer
- Accessories and options: cyclone separator, condensate drain, flange and counter flange kits, special varnish, corrosion protection

The air-water aftercooler is ideally designed for heat recovery and ensures the maximum possible heat transfer to cooling water.



JTI relies on energy-efficient compressor technology from AERZEN in Trier and on Tenerife

With negative pressure up to 20,000 cigarettes - per minute!

It was in 1908, when the first slim tobacco products left the cigarette factory of Heinrich and August Neuerburg. The two brothers recognised the signs of the times at the beginning of the 20th century: Modern cigarettes were the new tobacco trend and surpassed the previously popular cigars. Today, the cigarette production in Trier is under the label of JT International Germany GmbH - a German subsidiary of JT International SA, subsidiary of Japan Tobacco Inc. with well-known brand names such as Camel, Benson & Hedges or Winston.

The number of the day is 20,000. Today, modern machines produce 20,000 cigarettes per minute. "This is a very demanding process that needs to be mastered safely," says Arnhelm Köster, Head of Industrial Engineering at JTI in Trier. The Trier plant produced 50 billion cigarettes last year. The German company of the third-largest international tobacco group has 1,800 employees. In view of this high productivity at speeds far above one's own optical perception, nothing runs without the holding forces of the negative pressure.

High speed with negative pressure

In order to appreciate the importance of the highly available and precisely set vacuum of around 340 millibars, it is worth taking a look at the processes of a cigarette machine. The high speed makes it impossible to implement hold and transfer functions. "At about 20,000 units per minute, centrifugal forces occur, which we have to counteract by holding them. Mechanical solutions would inevitably result in deformations, marks and damage to the sensitive cigarettes," explains Arnhelm Köster. With a pressure corresponding to about one third of the atmospheric pressure usually prevailing, the cigarette paper is sucked from the roll outside to a contour so that it can lie around the round-shaped endless tobacco rolls. The paper is glued at the longitudinal seam and the finished cigarette rod is cut to length a little later. Vacuum is also necessary to connect the cigarette sections to their filters in a



Arnhelm Köster,
Head of Industrial
Engineering at JTI
in Trier:

The assemblies
should simply do
their job over a long
period of time.

continuous process. These processes can be compared to a fast-rotating carousel system of cylindrical product carriers that synchronously transfer the cigarettes from one station to the next. The negative pressure acts through small holes in the bulges in which the cigarettes are located. In the interior of the cylinders are certain vacuum levels. They act as a seal between zones of different pressure.

AERZEN Delta Screws play a key role

The short insight into the principle of modern cigarette production makes the importance of vacuum generation clear. "And we need vacuum in large quantities," emphasises Arnhelm Köster. JTI was looking for a new partner for this key function in the course of general modernisation and expansion of the plant, which is located in three central stations at the Trier plant. Today, two AERZEN Delta Screw screw compressors operate around the clock in station 3. It is the latest and also the one whose performance is used most. Two further stations with older devices are also connected to the vacuum network, but serve more redundancy in terms of operational safety.

With this distribution of tasks, JTI ensures availability and maximum efficiency in three-shift operation. "Redundancy is just as important a topic in industrial engineering as energy efficiency." The requirements profile for the compressors is derived directly from this for the head of industrial engineering: "I expect them to work efficiently, trouble-free and with low maintenance. The assemblies should simply do their job over a long period of time."

Close Project Cooperation

The decision for AERZEN was the result of an extensive market analysis. In addition, there was a recommendation from colleagues at JTI Global Engineering. "We compare data such as energy consumption over the life cycle and look at reference projects." In addition to energy efficiency, attributes such as high machine availability, numerous safety aspects and low maintenance requirements also count for the product portfolio of the machine manufacturer from Lower Saxony. The close cooperation with AERZEN Engineering did the rest to modernise and upgrade the vacuum supply quickly and smoothly. "There are companies that make good machines and there are companies that also make engineering around it - right up to the joint planning of projects. For example, when it comes to finding the best way to integrate the new technology into existing infrastructures," the JTI Production Manager describes the positive cooperation. And communication is the first priority. "We talk the same language." The success in Trier finally led to the fact that the same vacuum technology is now also in use in the JTI production plant on Tenerife.

The Delta Screws of type VML 95 are equipped on the Canary Islands as in Trier with a speed-controlled direct drive controlled by frequency inverter. With a



AERZEN screw compressors ensure perfect negative pressure at JTI in Trier.

drive power of 315 kW, each unit delivers a maximum volume flow of 5760 cubic metres with maximum energy efficiency. The necessary power requirement is directly coupled with pressure monitoring. The two VML 95 screw compressors are connected to a higher-level system by means of the AERtronic package control system. This gives JTI the possibility to operate the two machines optimally in combination. In addition, the way for machine monitoring is paved. "We want to know how our systems are doing and how well they are running," says Ulrich Kirchen, energy system electronics engineer at JTI. The integration of the Deltra Screw VML95 in the control level clears the way for preventive maintenance and condition monitoring in real time. With the correct analysis of operating conditions and individual values, the operating technicians can make reliable statements as to when the filters connected between production and the screw compressor are so blocked that they have to be replaced. These steps are necessary to protect the Delta Screw screws from unavoidable dust or tobacco particles from production. ○

Résumé

A look at the industrial engineering at JTI shows how important complete systems, including close engineering cooperation, are in projects. Investment decisions are made less and less on the basis of individual machine prices, but on the basis of a detailed analysis of the total cost of ownership. Availability also plays a central role here, because production downtime in the event of a malfunction usually assumes a multiple value of what may initially have been saved when the machines were purchased.



The special process steps in cigarette production require vacuum in large quantities. Machines are thus able to produce up to 20,000 cigarettes per minute.

The experience with AERZEN technology is so good that the same structure is also used in the JTI production plant on Tenerife.



Ulrich Kirchen, energy system electronics engineer at JTI, always keeps an eye on how well the systems are running.



Strung like a string of pearls: the 17 rotary lobe compressors of the AERZEN Delta Hybrid series have been installed on the central bridge of the six activation lines in the Aachen-Soers wastewater treatment plant.



"We use very good engineering within very good processes," says Thomas Zobel (left), Head of the Wastewater Treatment Plants Division at Wasserverband Eifel-Rur (WVER) (Eifel-Rur Water Association). The Aachen-Soers wastewater treatment plant, at which wastewater manager Nils Brand (right) works, also belongs to the WVER.



Machines of the AERZEN type Delta Hybrid have left the familiar environment of central machine rooms and are located under a long roof directly at the basin. Short pipe systems help to keep line losses to a minimum.

Aachen-Soers wastewater treatment plant modernises its activation and decentralises the aeration

Blowers must be arranged close to the basin

Through a holistic optimisation process, the Aachen-Soers sewage treatment plant has succeeded in reducing the enormous energy requirement of the activation process by around 55 percent. Among other things, rotary lobe compressors with their high energy efficiency over a wide adjustment range replaced the outdated turbo technology. All machines of the AERZEN type Delta Hybrid have also left the familiar environment of central machine rooms and are located under a long roof directly at the basin. Short pipe systems help to keep line losses to a minimum.

Wurm is the name of the river which receives water from the Aachen-Soers sewage treatment plant. And it wasn't so long ago (in the 20th century to be precise) that this small river on the border with Belgium had heavily polluted water. This came from the wastewater of the coal mines of the former Aachen coal mining area. The Rur tributary (not to be confused with the Ruhr) is just 53 kilometres long. Long sections of this river have either been canalised or straightened. Due to its gravel and sand landings, the Wurm today enjoys a place in nature conservation through small-scale ecosystems in which rare bird species such as the sandpiper and water pipit feel at home.

Nationwide model company

This valuable wildlife habitat came into being because the Wurm lost its sewage-laden character, even though about 80 percent of the water in the river comes from the discharges of sewage treatment plants. And it is precisely this special feature that drives the local residents to top performance when it comes to discharge values into this receiving water. "We use very good engineering within very good processes," says Thomas Zobel, Head of the Wastewater Treatment Plants Division at Wasserverband Eifel-Rur (WVER) (Eifel-Rur Water Association). The Aachen-Soers sewage treatment plant is part of the WVER supply area and is one of Germany's leading plants in terms of inlet values, fourth purification stage and energy efficiency.

The Aachen-Soers sewage treatment plant discharges 800 litres per second into the small river, which measures a water flow of just 200 litres per second in front of the receiving water area. With a capacity of 458,000 population equivalents, Aachen-Soers is one of the Class 5 sewage treatment plants which, according to Thomas Zobel, "normally discharge into receiving waters the size of the Rhine." In this particular case, the quality of the purified water must be correspondingly high-

end, so that the small river does not get any problem.

The team around Zobel and his wastewater manager Nils Brand have developed an ambition from these general conditions that is setting a precedent nationwide. The ammonium limit, for example, is 0.01 mg per litre. "Other systems with significantly larger receiving waters are used to completely different figures," says Brand. To ensure that the very good limit values - which for PO₄ are 0.1 mg/l - are not at the expense of energy costs, the Aachen-Soers sewage treatment plant has developed an integrated optimisation concept as part of a capacity expansion and has started a two-year large-scale trial for this purpose. The plant offers ideal conditions for this.

Field test on a large scale

One of the six activation lines available could be used for the field test. After the phase scientifically accompanied by RWTH Aachen University, it was clear that there would be no 1:1 replacement of the ten old turbo blowers of another manufacturer and ceramic fan plates. And the centralised supply of the activation with oxygen out of two machine rooms should belong in the past. "The blowers must be arranged close to the basin to reduce the piping losses," says Zobel. Furthermore, due to the outdoor installation, optimal inlet conditions for the machines prevail - and consequently very good conditions for the best possible oxygen saturation of the activator basins. This also contributes to increasing energy efficiency, as the running time of the machines is shortened by this efficiency in oxygen supply.

In conclusion, the days of the old turbo blowers with guide vane adjustment are over as a result of this innovation. Due to the extremely high maintenance costs, as well as the energetically uneconomical operation in the partial load range, they are no longer up-to-date and have consequently been replaced by modern, speed-controlled rotary lobe compressors of the AERZEN

Delta Hybrid series. Today, ten assemblies type D 52 S and seven assemblies type D 36 S with consistently the same motor rating of 55 and 45 kW have been assembled on the central bridge of the six activation lines - strung like a string of pearls. Two Delta Hybrids are directly assigned to each line. All others cover the increased air demand during nitrification and supply two lines at a time.

Speed control instead of throttle valves

The wide control range of the Delta Hybrid rotary lobe compressors, due to their design, paves the way for the Aachen-Soers wastewater treatment plant to ensure a demand-oriented supply of oxygen to the activator basins without throttle valves or slide valves. Whereas in the past a sliding pressure control was derived from the oxygen content, "today we regulate according to the nitrogen content," explains Brand. Ammonium and nitrate concentrations play just as important a role as the amount of waste water and the oxygen content. "Roughly speaking, we dose the air for each line individually according to the ammonium load," explains Zobel. This supply, which was optimally adapted to the prevailing process conditions in the individual lines, was not possible with a central infrastructure and volume distribution with throttles and slide valves.

The finer adjustment options improve the cleaning performance of the system on the

one hand and noticeably increase energy efficiency on the other. After optimisation, the electrical connected load of the entire sewage treatment plant fell by almost one third from 1,100,000 kWh in 2016. If the focus is on the pure process area of biology, the increase in efficiency through the new ventilation concept is even more pronounced: 320,000 kWh today compared with 720,000 kWh before - which corresponds to a reduction in consumption of 55 percent.

No minimum ventilation volume is necessary

These long-term energy savings are also the result of new polyurethane (PUR) plate aerators. "These are much easier to control and can also be taken completely off the grid," says wastewater master Brand, looking at the old ceramic units. They had to be continuously ventilated so that they did not clog - which resulted in correspondingly high energy costs for standby operation. As no minimum ventilation volume is necessary now, the complete adjustment range of the Delta Hybrid rotary lobe compressors from AERZEN can be used for control without regard to standby questions. In contrast with the old turbo blowers with guide vane adjustment, which quickly and massively lose efficiency to the right and left of the nominal operating range, the Delta Hybrids operate efficiently over a wide speed setting range. ○

Résumé

Energy savings are becoming more and more important in sewage water cleaning. Municipalities and associations are increasingly focussing on the money element. This was certainly the case at Aachen-Soers. However, there is agreement that efficiency improvements must not be at the expense of cleaning performance. On the other hand, sewage treatment plants that are about to be modernised due to their age offer plenty of potential for achieving better values more economically. The intelligent supply of oxygen to the activator basins plays a key role here in conjunction with holistic process improvements.

Based on this modification, the Aachen-Soers wastewater treatment plant became an international reference plant for the German Water Partnership, a renowned network of the German wastewater industry, which enables foreign operators and engineering offices to have site visits to see the plant in action. Thus, successful German technology is also transferred abroad.

New AERZEN subsidiary bundles turbo business for EMEA region

Establishment of Aerzen Turbo Europe

On September 1, 2018 Aerzen Turbo Europe GmbH, located in Rinteln, was officially founded. In the 50th(!) AERZEN subsidiary the turbo businesses for the EMEA region (Europe, Middle East, Africa) have been merged.

The heads of Aerzen Turbo Europe GmbH (from left): Erick Lugaro, Marco Möschter, Stephan Brand, René Ceada, Ingo Bartz



Turbo blowers with air foil bearings are an eminently important component in the AERZEN product portfolio. This is reflected in Vision 2022: AERZEN plans to sell at least 700 tur-

bo machines every year worldwide; a big part of them in the EMEA region. In order to reach the 2022 global target, Aerzen Turbo Europe will play an important role. "The new company will strongly support the sales companies responsible for acquisition and sales," emphasises Stephan Brand, Director Turbo Business, together with Klaus Heller, Managing Director of Aerzen Turbo Europe. The spectrum of tasks ranges from sales support and order processing to service, mounting of assemblies, packaging, development and engineering. "For example, we prepare quotations, specifications and documentation for the sales companies, and are involved in negotiations and customer meetings," says Sales Manager Ingo Bartz.

Three business segments

In addition to the standard assemblies and possible modifications, the new AERZEN subsidiary also covers two other business

areas. The so-called customising is about tailor-made customer solutions, such as turbo machines in containers, as outdoor installations or with AERsmart control. In selected projects, Aerzen Turbo Europe also wants to act as a supplier for system projects, i.e. not only supplying turbo blowers, but also providing the piping, electrical connections, etc. Stephan Brand is convinced that there is sufficient potential and applications in the EMEA region for this broad range of products: "Especially in the wastewater sector, our compact and efficient turbo blowers are a decisive alternative for meeting the growing demand for energy savings and tailor-made solutions in new construction and modernisation of wastewater treatment plants," says Brand.

René Ceada, responsible for development, engineering and purchasing, adds that the technological conditions for this have already been created: "We made a huge leap forward with the turbo generation G5Plus. In detail, this concerns the double-coated bearings for the motor, the new frequency converter and the revised assembly design for both small and large machines. Looking to the future, there are still many ideas for further solutions and innovations." This also includes a comprehensive range of services, which Service Manager Erick Lugaro is in charge of. ○

Stephan Brand,
Director Turbo Business AERZEN:

The mission of Aerzen Turbo Europe is to combine competence, customer and market orientation, as well as integration of the entire turbo range under the brand AERZEN.



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

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AERZEN

Customer event for the anniversary

40 years of Aerzen Nederland

40 years ago, the Dutch AERZEN subsidiary was founded. About 70 customers, as well as guests from the parent company, accepted the invitation to the anniversary celebration, which took place on 28 June 2018 at Aerzen Nederland B.V. in Duiven, near Arnhem.

Aerzen Benelux B.V. commenced operations on 5 February 1978 as an independent AERZEN subsidiary, with eight employees. Under Managing Director Peter Schulte the company developed steadily and was renamed Aerzen Nederland B.V. in 1986. Also under the guidance of Rob Lammers (from 2001) and Jos van Espen (from 2009), the company continued to grow. In 2017, turnover was already more than €16 million, with about 30 employees. Since 1 July 2018, Remko Knol is Managing Director of Aerzen Nederland. The management team includes Siert Wiersema, who since 2005 has focused on sales and marketing; and there is sales manager Tim van Haren, technical/after sales manager Jeroen Boekhorst, and Jet Wiersema Roghair in administration.

The Dutch subsidiary is number 1 in the domestic market with its comprehensive AERZEN product range of blowers, compressors and turbo machines. The special feature is that Aerzen Nederland not only sells standard products, but also offers special solutions, which are designed and

A photo with great symbolism: customers of Aerzen Nederland together with Stephan Brand (l., Vice President Marketing & Product Management AERZEN), Remko Knol (2nd from right, Managing Director Aerzen Nederland) and Klaus-Peter Glöckner (r., Managing Director Aerzener Maschinenfabrik) are pleased to celebrate 40 years of Aerzen Nederland.



assembled in Duiven. An example of this is the VacoMaxx assembly, a combination of vacuum blower and oil-injected VMX compressor on a compact base platform for unloading cement from ships. Aerzen Nederland has already sold about 400 bespoke, oil-injected VMX compressed air packages with diesel or electric drive. The main customers are domestic shipyards, which often operate worldwide, and the cement industry. About two thirds of Aerzen Nederland's customers come from industry. Multinational companies such as DOW and BASF, and also well-known companies such as Van Aalst Marine & Offshore, Van Aalst Bulk Handling, Cargomaxx, Cummins and Sibelco rely on the know-how, experience and strong after-sales service of the team at Duiven. The other important customer

group is Original Equipment Manufacturers (OEM) from the plant engineering sector. "In addition to our product and consulting quality, the price is what counts here," says Knol.

The 40th anniversary event impressively proved how strong the bond is between Aerzen Nederland and its customers. The programme included four presentations by customers, who presented their business concepts in connection with various AERZEN applications. The speakers were the managing directors and division heads of the Van Aalst Group (bulk handling), Dinnissen Process Technology (pneumatic conveying), Royal Haskoning DHV (waste water treatment) and Paques (industrial waste water technology, desulphurisation technology). ○