

KAESER report

A magazine for the production industry

2/20



SIGMA AIR UTILITY:

**Quality compressed air
– zero investment**

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COVID-19: The day will come when all is resolved

After nine months of fighting the pandemic, the battle is unfortunately still not yet won. We remain in the midst of an extremely serious and complex crisis that affects everybody and everything. We must not look away, but tackle the situation head on and do everything we can to defeat the pandemic with utmost care and caution.

Of the key objectives in overcoming the pandemic, the first – and most important – is to safeguard employees' health and lives to the greatest extent possible. Therefore, in our professional lives as in our private lives, this means maintaining physical distance, wearing masks where physical distancing is not an option and accepting the tough restrictions placed on classroom trainings and meetings. These measures are essential to prevent further spread of the virus.

The second objective is to maintain business operations. Even if certain areas do not operate at peak performance, operability of the company as a whole must be ensured, in the interests of our customers, suppliers and every single employee.

Only in this way is the third objective, job security, possible and achievable.

When physical distancing is an absolute necessity, social proximity becomes more important than ever.

We must therefore strive to maintain even more meaningful personal and substantive contact with each other and with all of our partners, customers and suppliers, through telephone calls, video conferencing and online workshops.

In these difficult times, we need to be there for one another and provide mutual support more than ever.



Dipl.-Wirtsch.-Ing.
Thomas Kaeser
Managing Board



Dipl.-Wirtsch.-Ing.
Tina-Maria Vlantoussi-Kaeser
Managing Board

Health and the economy go hand-in-hand: when things go wrong in the economy, this often has a negative impact on health and prosperity. In the same way, when matters of health are neglected, the economy tends to suffer.

Entrepreneurial action based on solidarity, hope and confidence in the future ultimately benefits everyone. Even if the situation is exceptionally challenging, worry and fear solve nothing. It is not a matter of introducing ever more interdictions, but of complying with sensible rules that help to manage, and therefore reduce, risk.

Future virus outbreaks are inevitable. Pandemics, on the other hand, can be prevented through swift communication, global coordination and concerted discipline. However, this does not mean that we should cast our values aside; rather than sacrificing them to the pandemic, we should treasure and live by them sustainably. Trust and solidarity have a special role to play here. The more trust there is, the better one's life is at work and at home. People are less stressed, live healthier and are happier.

Although life in the future may not look exactly the same in every respect as it did before, it makes sense for all of us to work together to ensure that our lives continue to be more conscious, sustainable and supportive even after the battle against the pandemic has been won.

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State-of-the-art rotary screw blowers for the wastewater treatment plant at Neustadt an der Weinstraße

From wine into water...

For wastewater management companies located in Germany's wine-lands, the beginning of the winemaking season in the autumn marks their busiest time of the year by far. The introduction of lees, grape pomace, yeast and yeast residue, amongst other leftovers from the wine industry, into the sewerage system represents a considerable challenge for local treatment facilities. Not so, however, for the wastewater treatment plant at Lachen-Speyerdorf, which recently benefited from the installation of an ultra-modern blower station – courtesy of KAESER KOMPRESSOREN.

The wastewater treatment plant at Neustadt an der Weinstraße is owned and managed by the town's in-house waste disposal operation (Eigenbetrieb Stadtentsorgung Neustadt an der Weinstraße, or ESN). Located in the district of Lachen-Speyerdorf, the facility was designed to provide water treatment services for 85,000 residents and handles around 4.25 million cubic metres of wastewater per year; it serves every district in town, including the town centre. By the parameters under which it is monitored, the average cleaning performance stands at over 90%.

Staying ahead of the curve

Commissioning of the Lachen-Speyerdorf treatment plant originally took place in two distinct stages. Mechanical pretreatment was available from inauguration in 1975, whilst biological treatment in the form of an activated sludge procedure followed a few years later, in 1978.

In principle, the biological treatment stages of a water purification plant function the same way as does the organic self-cleaning process undergone by waters in nature, albeit in a technically optimised and considerably less time-consuming fashion. Biological purification takes place after the mechanical pretreatment phase, using

billions of microorganisms to convert dissolved matter in the wastewater (organic carbon, nitrogen and phosphorus compounds) into settleable solids – i.e. a biomass – by means of their metabolic activity. The biological purification stage can be divided roughly into two separate processes: nitrification and denitrification. Nitrification is the biological oxidation of ammonia to nitrate, via the intermediate stage of conversion to nitrite. This transformation is undertaken by aerobic bacteria. Subsequently, denitrification takes place by means of introducing anaerobic micro-

organisms, which serve to reduce the nitrate to elementary nitrogen. Matter contained within the untreated wastewater provides a source of nourishment for the bacteria in the activated sludge, thereby ensuring a constant regrowth. Their only other requirement is, of course, a supply of oxygen. There are various ways of achieving this. Back in 1994, a pure oxygen aeration system was installed for the biological purification stage – a decision taken on the basis of the prevailing circumstances at the time. This, however, proved to be an expensive solution in the long run,

on account of the need to procure regular supplies of pure oxygen. Therefore, one of the aims of the recent modernisation of the facility was to find a more cost-effective solution for the aeration processes, which would ultimately mean replacing the blower station.

A new brief

2015 saw the implementation of a comprehensive, multi-stage renovation and rehabilitation project at Lachen-Speyerdorf. The aim was to optimise the existing systems and equipment, from refurbishing the concrete in the tanks to renewing the lines and updating the electrical systems and software. Not only this, but the project set out to achieve clear cost savings and efficiency gains, whilst maintaining the facility's impressively high cleaning performance of around 96%.

Increasing energy efficiency levels whilst simultaneously reducing costs happens to be KAESER's core competency. It transpired that, having installed a KAESER blower for supplying oxygen to one of the nitrification tanks back in 2003, the operators at Lachen-Speyerdorf were already familiar with the reliability and performance of the products and services on offer from the Coburg-based systems manufacturer. Another factor that stood out in their favour was the availability of a full, 10-year service contract.

Turbo blowers or rotary screw blowers?

When considering which of KAESER's energy-efficient blower models would be

best suited for converting the tanks from pure oxygen aeration to compressed air aeration, there were two choices in the running; turbo blowers and rotary screw blowers would both be equally adept at fulfilling the plant's requirements. In terms of energy consumption, there was not much in it either. In the end, the decision came down in favour of rotary screw blowers on account of their superior controllability, which comes into play from being able to split the individual units and apply differing flow rates. Hence, since the autumn of 2019, the supply of air for the two 4m-deep aeration tanks has been provided by a type DBS 220 L SFC 30 kW (max. pressure differential 650 mbar, max. flow rate 23 m³/min) and two type EBS 380 L SFC 37 kW (max. pressure differential 650 mbar, max. flow rate 38 m³/min) rotary screw blowers, each one equipped with a frequency converter.

In addition to these units, further new machines would be required for the purposes



An aerial view of the facility at Lachen-Speyerdorf.

sure differential 1100 mbar, max. flow rate 22 m³/min) and two type EBS 380 M SFC 45 kW (max. pressure differential 1100 mbar, max. flow rate 37 m³/min) machines, also each with frequency converter. One of the two larger units is sufficient to cover the necessary redundancy to ensure that the compressed air supply can still be covered in full when it comes to maintenance

Our new rotary screw blowers deliver clear cost savings with superior efficiency.

of rehabilitating a 5.5m-deep nitrification tank, the aeration system for which had at some point previously been converted from coarse-bubble disc diffusers to fine-pore membrane plate diffusers. Here again, cost savings and reliability of supply were the guiding principles and this time the solution was a DBS 220 M SFC 30 kW (max. pres-

or repair work, or in cases of fluctuating air demand (such as occur during the grape harvest). This new, state-of-the-art blower station easily fulfils all the technical prerequisites necessary to guarantee peace of mind for the operators at the Lachen-Speyerdorf treatment plant – even at the height of the winemaking season!



The blower station at the Lachen-Speyerdorf wastewater treatment plant, with its high-efficiency rotary screw blowers from KAESER KOMPRESSOREN.



The refurbished aeration tanks.

SPAX – Turning heads with innovation

SPAX International specialises in the latest fastening technologies.

The history of the screw goes back considerably further than the “SPAX revolution”; its basic form has existed since the Bronze Age (c. 2500 BC). One of the most famous screw designs of all time was the “Archimedes screw” (250 BC), a tip-less screw used for conveying water and named after the Greek mathematician who was its alleged inventor. The principle of the screw thread was also harnessed by the ancient Romans for a variety of purposes: for distance-measuring instruments, wine and oil presses, and fastening elements on items of jewellery, medical devices and astronomical instruments. And let us not forget Leonardo da Vinci (1452 – 1519), an all-round genius who drew sketches of motion and fastening screws whilst conducting intensive investigations into the potential applications of the thread.

Made in Germany

Moving ahead to modern times, the earliest screw forges in Germany appeared around the end of the 17th century, in the Rhineland and Westphalia, followed around a hundred years later by the first factories dedicated to the wholesale industrial manufacture of screws. One of the first of these was founded in Ennepetal in the year 1823 as Altenloh, Brinck & Co. and it was not long before the abbreviated name of ABC became synonymous with fastening elements of the

highest quality. They began their first international exports only a short while after, in 1829. However, their major international breakthrough did not come until 1967, with the launch of their game-changing SPAX screw (the name is derived from the German term for “chipboard screw with X-slot”). SPAX today is a registered trademark, not to mention a generic acronym widely used for chipboard screws.

Today SPAX International GmbH & Co. KG provides jobs for 500 employees, producing up to 50 million screws every single day. Charmingly, this international success story is still based at the site where it all began back in 1823. This fact has both its advantages – as manifested in pleasing architectural details such as the splendid columns supporting the roof in some of the production halls – and its disadvantages, such as the challenges associated with accommodating a growing array of new systems and machines in a building almost two centuries old. Creative solutions have had to be found quickly when it has transpired that a doorway was simply too narrow for a compressor or refrigeration dryer to pass through it; at times this has involved breaking out the air hammers to create an extra half-metre of clearance.

The facility's air station received its latest upgrade as recently in March 2020, with

the addition of a SECOTEC TG 980 refrigeration dryer from KAESER. This was in addition to the existing equipment of two type DSDX 245 (8.5 bar) rotary screw compressors, a DSD 205 SFC (10 bar) peak load machine, two 5000-litre air receivers and a whole array of compressed air treatment components and filters. The entire station is monitored and controlled by a SIGMA AIR MANAGER 4.0 master controller for maximum energy efficiency, as evidenced by the extremely low idling rate of 1.8%.

Compressed air required

As you might expect, compressed air demand is high throughout the screw manufacturing process. The greatest

requirement comes from the pressing plant, at 45% of total demand. It is here that the threadless screw blanks are cut from the raw material (using a so-called “wire feed” – metal wire drawn onto reels)

It may not be possible to reinvent the wheel, but it seems the same cannot be said of the humble screw. In fact, that is exactly what engineers in Ennepetal did in 1967: in place of the conventional wood screw with a single slot, they developed a completely new type of screw. Featuring a pioneering new head design with a cruciform drive, it ensured a perfect transmission of force and could be driven effortlessly through wood, thanks to its new shaft profile and innovative tip. This breakthrough represented a genuine revolution in fastening technology and the beginning of a global success story.



Based in Ennepetal, the company produces up to 50 million screws per day.

and the distinctive SPAX screw head is pressed. Each machine or station in the pressing plant operates to the same procedure, the only variance being in the dimensions of the end product. Compressed air has a variety of roles throughout, including pressure shut-off and cylinder activation of the machines. One of its most important uses, however, is as blow-out air for removing the finished blank once it has been processed.

The next highest level of air demand comes from the rolling area (30%), where the threads are worked into the blanks. This is achieved by the movement of rollers across the length of the screw. In this section, compressed air is used as control

number of different smaller consumers, such as the tooling facility and the hardening shop, where the blanks are heated up to 940 °C before being doused in oil. It is this procedure that endows the finished screws with their exceptional strength – by the time they have been cleaned and reheated in a tempering furnace, the surface tension of the blanks has been enhanced many times over.

Compressed air is of vital importance to every station involved in the screw manufacturing process, but even small fluctuations in the air supply can negatively affect availability. Before the recent modernisation, fluctuating consumption in the tooling facility occasionally made it

of supply that goes hand-in-hand with a modern compressed air station.

The SPAX screw with its distinctive cruciform drive.

Of particular pride to the customer, the KAESER air station boasts an exceptionally low idling rate of just 1.8%.

air for the vibrating conveyors, which serve to ensure that a continuous stream of blanks is fed into the 85 processing machines operating there. The remaining 25% of the air demand is accounted for by a

necessary to deploy additional machines temporarily to cover demand. Such challenges now belong thankfully to the past and SPAX is reaping the benefits of significant energy cost savings and the security



NEW

KAESER's latest product solution for the beverages industry

Booster systems come into play when, for technical reasons, specific points in a production process require a pressure higher than the existing network pressure. A good example of this scenario is in PET bottle production, where it does not make economic sense to configure the entire compressed air network to operate at a higher pressure than is needed for most processes – boosters provide a far more cost-effective solution. KAESER KOMPRESSOREN is proud to open a new chapter in the story of booster technology with the introduction of its innovative complete systems.

Huge savings with KAESER boosters

In the second half of 2020, KAESER KOMPRESSOREN is drawing considerable attention from customers and prospects in the beverages industry with the launch of its CNC range of boosters. These innovative new models offer companies engaged in applications such as PET bottle production the opportunity to benefit from huge savings.

CNC series boosters from KAESER

In applications where certain points require process air at a higher pressure than that of the normal control and working air, it is far more economical to use boosters than to design the entire compressed air system to operate at that higher pressure. Combining a new CNC series booster system with, for example, a KAESER rotary screw compressor allows for an energy-efficient design that can cater for diverse applications up to 45 bar.

CNC series boosters are delivered as turn-key machines, meaning that remarkably little effort or cost is required to install them. Their advanced design allows the operator,

quite literally, to simply “plug and play”.

Incredible space-saver

With a footprint less than half that of their predecessor models, these compact complete machines offer everything you could need from a modern booster system. A new, cleverly designed layout ensures an opti-



mised cooling air flow and easy access for maintenance and service work. Automatic belt tensioning and condensate removal ensure that very little maintenance effort is required on the part of the operator, whilst the energy-saving SIGMA CONTROL 2 internal controller ensures that CNC boosters are network-capable and fully compatible with Industrie 4.0 environments. What is more, they are equipped with a full sound enclosure for outstanding levels of noise insulation.

Wide range of applications

CNC series boosters are twin-cylinder reciprocating compressors, a fact which positions them below KAESER's DNC range of boosters in terms of performance. Automatic belt tensioning provides optimised power transmission between motor and compressor block, whilst also reducing the need for maintenance. A highly efficient aluminium-block cooler ensures that these compact powerhouses can achieve extremely low compressed air discharge temperatures, thereby guaranteeing optimal temperature conditions for the down-

stream treatment components. CNC series boosters are available in a variety of models (CN 7 C, CN 11 C, CN 15 C and CN 22 C, featuring respective motor capacities of 7, 11, 15 or 22 kW) for a diverse number of applications.

Initial pressure is from 3 to 13 bar, final pressure from 10 to 45 bar. Frequency-controlled and nitrogen versions are also available.





Flooring specialist ter Hürne relies on quality air from KAESER

The natural choice

All Images: ter Hürne GmbH & Co. KG

The naturalness and beauty of wood make it a unique material, that creates endless possibilities for a cosy, comforting and stylish home – a fact not lost on ter Hürne. This family business, based in the German state of North Rhine-Westphalia, is celebrated at home and abroad for its innovative and attractive floorings of wood, laminate and vinyl. Over the course of its 60-year history, ter Hürne has established itself as a market leader in its field, both on the national and international stages.

Otger ter Hürne established the company that bears his name in the village of Südlohn (North Rhine-Westphalia) in 1959, at the height of Germany's economic miracle. In its early years, the company produced door frames and panelling, but its founder had ambitious objectives and a clear plan for how to achieve them. Intent on building an industrial enterprise, he brought these plans to fruition in the 1970s with the development of the company's first export markets. Whereas throughout the 1980s the business' core segment was concentrated around wall cladding and panelling, in the 90s they branched out into the flooring market with the introduction of innovative veneered, parquet

and laminate flooring, and by the end of the century this new segment accounted for 70% of the company's turnover. ter Hürne's revolutionary "CLICKitEASY" joining technique laid the foundation for a completely new, world-leading type of flooring.

Throughout these decades of change however, one thing remains the same: the family-owned company is dedicated to the development of healthful products that set the very highest standards in functionality, aesthetics and sustainability, just as it did 60 years ago. This focus on healthy living is clear when it comes to the selection of raw materials – ter Hürne's parquet floor-

ing is manufactured from genuine wood. Not only that, a majority of the wood used for the core layer strips is sourced from the local area and natural materials, such as finishing oil derived from linseed and walnut, are used for surface finishes. When specially treated with oils, parquet remains breathable, which is an important factor for a healthy environment.

Ecology and efficiency

ter Hürne is dedicated not only to producing natural, intelligently conceived flooring solutions to German quality standards, but also to maintaining a responsible operation by means of thinking and acting sustainably at all times. This philos-

ophy pervades the entire business, from the quality of the end product to the employees' working environment, the production systems and the processes themselves. And it so happens that when a modern manufacturing operation decides to overhaul its processes and systems, the spotlight shines inevitably on its compressed air supply. In the case of ter Hürne, an initial energy review highlighted potential savings that were nothing short of enormous. It transpired that the entire company was using 4.5 million kWh per year of power, which was approximately equivalent to the combined electricity consumption of 1000 four-person households. The compressed air supply alone



Numerous machines throughout the production process rely on compressed air.

accounted for 12% of total power consumed, or to put it another way, 120 of the 1000 households mentioned above. These findings resulted in a project being conceived under Energy Management Project Leader Thomas Brüning and Mainte-



nance Manager Ferdinand Kremer, with the objective of optimising energy usage through the application of state-of-the-art technology. They immediately set about the task of procuring particularly energy-efficient, high-tech compressors and accessories, with a fivefold brief in hand: optimise energy consumption, reduce maintenance costs, provide seamless, round-the-clock compressed air availability, ensure the necessary redundancy for maintenance and repair work to be carried out, whilst all the time allowing for potential future expansion.

High compressed air demand

A tour of the facility quickly reveals the extent to which the company relies on compressed air. Step into the 45,000 m² production hall and you become immediately aware of the various hissing and stamping sounds from every corner of the pleasantly

KAESER's compressed air station allowed us to achieve our holistic, ecological design concept.

Thomas Brüning (Energy Management Project Leader)

wood-scented building; visitors are left in no doubt how integral a part of this operation compressed air truly is. The greatest slice of total air demand is used by the machines that process the flooring, which include presses, forming systems, sanding and lacquering machines, as well as control and processing technology. Compressed air is also needed to clean and drive the machines and, last but not least, for some of the building systems, such as those used for filtering the ambient air and for opening/closing doors.

When it came to designing a new compressed air station capable of providing a round-the-clock supply of quality compressed air to all of the various applications, the project team – under Thomas Brüning and Ferdinand Kremer – made the natural choice and consulted KAESER. This resulted in investment in two speed-controlled type CSD 105 SFC and two type CSDX 140 rotary screw compressors to supply compressed air at 6.5 bar. This new generation of CSD/CSDX machines features a perfectly matched reluctance motor and



For their surface finishes, ter Hürne uses finishing oil derived from linseed and walnut.



frequency converter combination, which unites the benefits of both synchronous and asynchronous motor technology in a robust and service-friendly drive system that provides exceptionally flexible control. Meanwhile, a highly efficient, space-saving SX-6 rotary screw compressor was procured to provide the air supply for the spark-extinguishing system and three energy-saving SECOTEC TF 230 refrigeration dryers were chosen to provide compressed air drying. The star of the show is the advanced SIGMA AIR MANAGER 4.0 master controller, which continuously monitors and controls every component in the air station to ensure perfectly coordinated interplay. Peak performance and efficiency are assured at all times through calculation of optimal machine operation, whilst predictive maintenance reduces servicing costs and eliminates the need for superfluous inspections.

The new compressor station and associated treatment equipment were installed without a hitch during the holiday shutdown in 2019. They have since gone beyond merely meeting expectations – an energy consumption analysis for the months of August and September reveals that the ambitious target set for energy savings has not only been achieved, but comfortably exceeded.

Above: Inside the modern, 45,000 m² production halls, natural and intelligently conceived flooring solutions are produced to German quality standards.

Below: A reliable supply of compressed air is ensured by four KAESER rotary screw compressors, whilst treatment is provided by three energy-saving SECOTEC refrigeration dryers.

Visiting the stargazers of Hawaii

The sky's no limit

On the island of Hawaii, amid the vastness of the Pacific Ocean, the Canada-France-Hawaii Telescope (CFHT) sits high atop Mauna Kea – the planet's largest dormant volcano. Situated at a height of almost 4200 metres, it is one of thirteen telescopes in the vicinity, all taking advantage of the pristine conditions for stargazing and marveling at the wonders of the cosmos.

Initiated in 1979, CFHT is a joint research facility which operates a telescope atop the dormant volcano of Mauna Kea on Hawaii. A collaboration between Canada's Herzberg Astronomy and Astrophysics Research Centre, the Institut National des Sciences de L'Univers in France and the University of Hawaii's Institute for Astronomy, the facility boasts a world-class, 3,6 metre optical/infrared telescope that is mainly controlled from the observatory's headquarters in the quaint little town of Waimea. Here, a team of over 40 engineers, technicians, astronomers and administrators now use remote-operated Queued Service Observing almost 100% of the time. While the primary mirror is relatively small, their use of cutting-edge technologies – such as adaptive optics and wide-field imaging – achieve impressive results for the scientific community. CFHT's work aims to answer some of the most perplexing questions facing astronomers today – what is dark energy, are Earth-sized planets common in the universe and finally, what is the ultimate fate of the universe?

Top of the World

The Mauna Kea and its Visitor Information Station, located at 2700 metres, are very popular with tourists. It is not easy to get here. The road past the Visitor Information Station is rocky and uneven, meaning a 4WD vehicle is needed to reach the summit facilities. The weather can change in an instant without warning, impeding progress up the steep mountain road. Altitude sickness is a real problem and can strike even the

most experienced visitor – including staff members of the observatory. Yet despite this, people are drawn to the summit to get closer to its fascinating science and stark beauty, as well as its cultural significance for the native Hawaiians.

With the Canada-France-Hawaii telescope, the researchers are looking for answers to the central questions of astrophysics.





The KAESER screw compressor AS 30 must meet highly specific requirements at an altitude of 4200 m.

Compressed air makes it all possible

The telescope's primary mirror, made of solid, thermally stable glass and weighing in at 11,000 kg, features 24 flat pistons, each about 31 cm in diameter and 5 cm thick. These pistons are powered using compressed air, which must not only be exceptionally clean and dry at a very precise pressure. "The pressure required to support the pistons on this equatorial telescope must be controlled by a unique passive reg-

ulate scientific observations that may be lost forever.

Compressed air also has a role to play when it comes to protecting the telescope's mirrors. It is used to power special covers which protect the mirrors from dust, debris and falling objects. If these covers don't open properly, critical observation time can be lost. "We need to ensure that all functions are supported each and every night, unmanned, without fail," says Green. "We are operating under very specific conditions. There are incredibly few compressors that can operate at 4200 metres. Kaeser's team of specialists were the only ones willing and able to take the time needed to engineer the right solution: an AS 30 (US-market specific model) rotary screw compressor with add-on desiccant dryer, customised to our exact needs."

In addition to standard applications, such as powering pneumatic tools in the machine shop, compressed air is used as

purge air inside the various instrument cabinets, in order to keep icing to a minimum. All CFHT's instruments are cryo-cooled, as condensation and ice can build up if humid air comes into contact with these extremely cold surfaces. The CFHT is a non-profit research corporation, so the procurement costs of such projects are an important factor. The same applies to running costs: in a place where energy costs \$ 0.31 per kWh, the approximate 30% energy saving potential that KAESER products have to offer is a key consideration. Accordingly, KAESER has designed the system to perform and provide longevity, durability and efficiency. This is also important for a new project, which aims to establish another 10-metre telescope within the next five years.

Those approaching the traditional white dome and emblematic retractable roof probably don't know that without compressed air, capturing spectacular images of the universe would simply not be possible.



Images: CFHT

The many spectacular insights we gain here into the depths of the universe are only possible thanks to compressed air.

ulation system to within 0,00069 bar over two axes," states Greg Green, Mechanical Designer and Instrument Maker for CFHT. The mirror must be supported 24 hours a day, seven days a week without failure. A single lost night of observation is valued at approximately \$20,000 and, more importantly, could represent a window to com-

Top-quality golfing with KAESER rotary lobe blowers



The well-tended greens are the flagship feature of the Pennant Hills Golf Club.

All-in for a hole-in-one

Set amongst the picturesque green hills of Beecroft in the Australian state of New South Wales, the Pennant Hills Golf Club is the fourth oldest golf club in the area. Founded in 1923, it still occupies its original location in the Hills Shire district to the northwest of Sydney. Over recent years, a lengthy period of drought caused by persistently high temperatures and strong winds across the whole of southern Australia has turned the upkeep of its green areas into one of the greatest challenges facing the club today.



Rich in tradition, the Pennant Hills Golf Club was founded in the 1920s.

Mention the words "golf course" and most people immediately bring to mind images of endless, lush green grass stretching far away into the distance. Even in Australia, where large parts of the country has experienced severe and long term drought, a luxurious growth of grass is an essential prerequisite for any golf club. To keep its expansive turf areas well-groomed and healthy, the Pennant Hills Golf Club (PHGC) needs to provide them with a constant supply of high quality irrigation water. However, with the municipal water supply also under pres-

sure from growth and drought in the region, the time had clearly come for the club to start looking at new solutions for an independent supply of its own.

Groundbreaking sewer mining project

Having taken the time to search for the right consultants, PHGC approached Permeate Partners – a consultancy specialising in the analysis, procurement, operation and maintenance of water and wastewater infrastructure. Known for meeting the challenge of increasing water scarcity head-on with innovative solutions, "recycling" is the



Our COMPACT rotary lobe blowers have proven their reliability – still running perfectly after over 12 years of operation.



Four COMPACT-series rotary lobe blowers from KAESER are used to deliver process air for the membrane bioreactor.

watchword for these water industry experts. According to their calculations, the most cost-effective solution for irrigating the green areas of the golf club was to recycle wastewater sourced from the nearby sewers, using a technique called sewer mining. State-of-the-art technology would then be brought to bear, so as to ensure that the wastewater is sufficiently treated to meet the necessary quality levels. This is where the rotary lobe blowers from KAESER come into play; blowers are a key component of any wastewater treatment facility and the water recycling plant at PHGC is no exception. Fortunately, the premises at Pennant Hills included a patch of unused land situated just 100m from the sewer in

question, which would prove the perfect location to construct the new recycled water plant.

Low-pressure process air

At the heart of the wastewater treatment process lies a membrane bioreactor. In this system, the treated water from the biological reactor is drawn through the surface of a membrane, which serves to remove any remaining solids and pathogens. When the suspended solids are rejected from the membrane surface, they are returned to the start of the biological reactor. The water which passes through the membrane can then be reused following further disinfection via UV and chlorine.

The Pennant Hills Water Reclamation Plant commenced operation over 12 years ago and is capable of producing up to 650,000 litres of high-quality recycled water per day, which is used to irrigate the golf course.

For this procedure to be effective, a dependable source of low-pressure process air is needed. Two compact, type BB 88 C rotary lobe blowers (15 kW, max. usable flow rate 8.2 m³/min) from KAESER provide the biological reactors with oxygen aeration for the microorganisms active within. Two further KAESER rotary lobe blowers – this time 7.5 kW BB 88 C (max. usable flow rate 4.7 m³/min) – serve to aerate the membranes, which prevents any suspended solids from sticking to their outer surfaces.

Rotary lobe blowers from KAESER's BB-series are compact complete machines featuring OMEGA Profile rotors. Delivered ready for connection, including a full set of sensors, star-delta starter (or frequency converter) and complete CE and EMC-certification, they considerably reduce both the workload and expenditure associated with planning, assembly, certification, documentation and commissioning. As with all KAESER products, they are designed for maximum levels of efficiency, reliability and durability and, thanks to minimal maintenance and service requirements, guarantee lowest possible life-cycle costs.

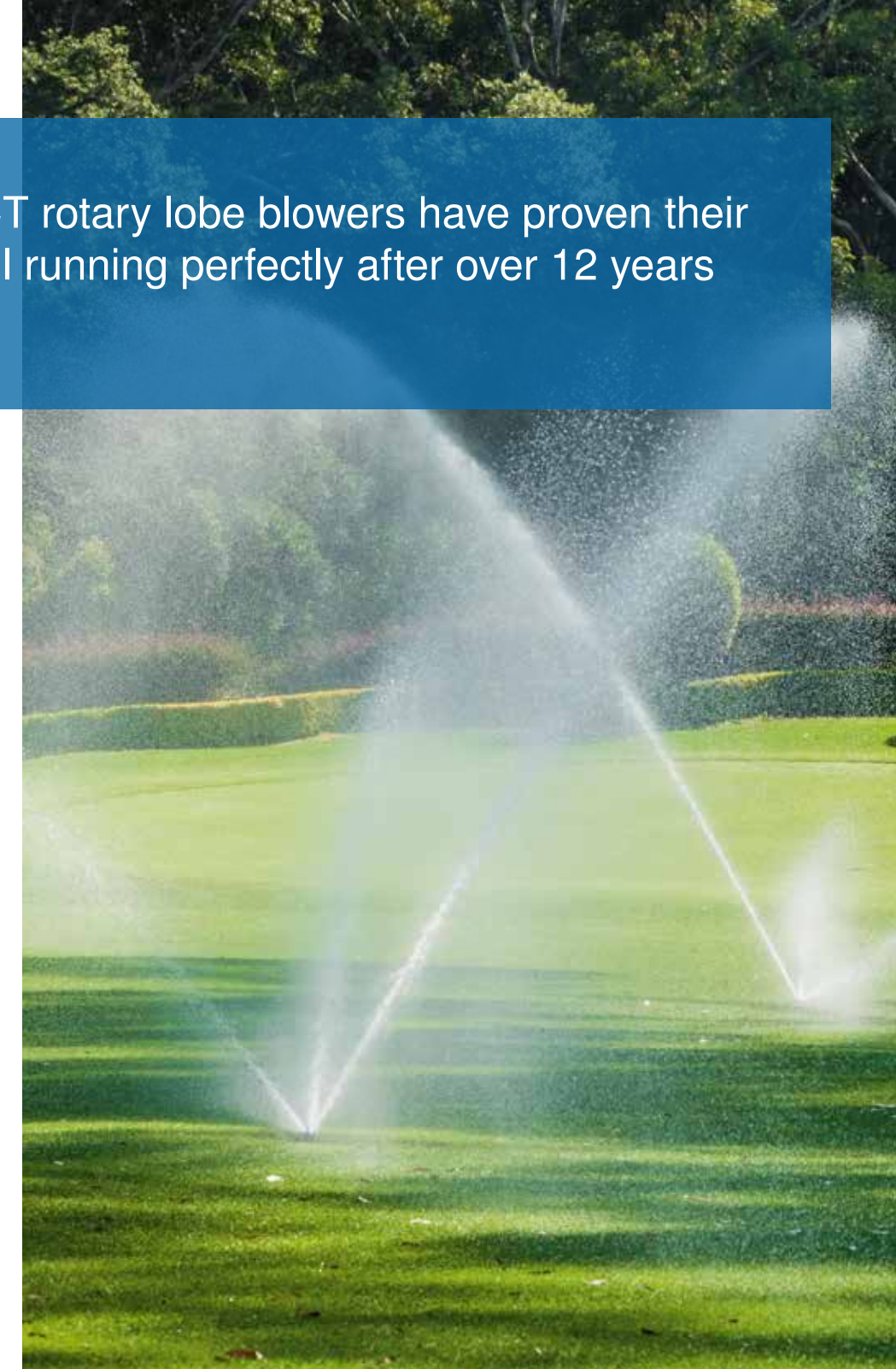
The innovative solution from Permeate Partners was to use treated wastewater for the purposes of irrigation.

Years of satisfaction

The wastewater treatment plant at Pennant Hills was commissioned around 12 years ago and has been providing up to 650,000 litres of high-quality, recycled water per day ever since. Approximately 98 % of the water sourced from the sewer system is recycled for the purposes of irrigating the greens, with the remaining 2% flowing back into the sewers as activated sludge.

Kurt Dahl, Managing Director at Permeate Partners, sums up his satisfaction with the four rotary lobe blowers: "In operation now for over 12 years, they have proven their reliability and are still running perfectly. As the plant is nestled within the course, it was important that we selected equipment with low noise levels and the KAESER blowers have certainly proven to be quiet operators, contributing to the overall whisper-quiet sound level of the plant."

The water recycling plant supplies the club with its own source of irrigation water.



Where snacks meet compressed air – or do they?

When you decide to treat yourself to a sandwich at a service station, or when you are served a wrap or panini whilst cruising through the air at 10,000 metres, there is a good chance that it originated in QiZiNi's creative kitchens – this Dutch company, which produces more than 200,000 fresh wraps, burritos, paninis and luxury sandwiches a day at two sites in the Netherlands, counts service station operators and several airlines amongst its customers. As you would expect, a clean supply of food-grade compressed air plays a key role in their production processes. So when it came to selecting the compressors for those two production facilities, it was only natural that they should turn to KAESER...

In the food industry, it is absolutely vital that compressed air meets the highest standards of quality and purity.



For its diverse selection of wraps, QiZiNi uses only the best, freshest ingredients.

QiZiNi was founded in the Netherlands in 2011 as a joint venture between Johma Sandwiches and Greencore Nederlande. Part of Germany's Natsu Foods Group since 2015, its specialities include freshly prepared wraps, sandwiches and baguettes for immediate consumption, as well

as paninis and burritos to be warmed up later at home. Customers include supermarket chains, petrol stations, catering companies and airlines, principally in France, Germany and the Benelux countries – where their products can be found under both the QiZiNi and Natsu brand names, amongst others. The company's two Dutch production facilities in Alphen aan den Rijn and Losser provide jobs for more than 250 people.

Freshly handmade – every day

According to Head of Maintenance Henk Blankenstijn, responsible for all the production machines and technical systems in operation at QiZiNi's site in Losser, turning out such a wide variety of products quickly, efficiently and safely is a major challenge. "Despite the fact that a lot of our work has to be done manually, we are trying to automate as many stages as possible, because efficient production processes are an important factor for remaining competitive in this market," he explains. "But automation is a big challenge in this industry. We are working with fresh produce that varies

enormously in shape, weight and individual characteristics. This makes it difficult to use robots or other machines for such purposes as putting together rolls, or packaging. Things are easier when it comes to applying sauces or dressings, because here an automatic dosing system can be used."

Super-clean compressed air

QiZiNi's facility in Losser covers an area of 5000 m² and contains a broad range of processing and packaging machines. Compressed air plays an important part in the production process – for controlling the machines by means of pneumatic cylinders, for example, and for cleaning the machines and processing tables.

"The compressed air never comes into direct contact with the product itself," explains Henk Blankenstijn. "But it is used to clean machines and surfaces that do, so we have to ensure that the air meets the strictest food-grade quality standards. In practice, this means it must comply with the specifications laid down in ISO 8573-1, which are 1.2.1".

Achieving this level of purity – which demands a pressure dew point of -40 °C – requires the use of a desiccant dryer with oil/water separator and activated carbon filter, not to mention various other KAESER Filter products as well.

QiZiNi's smoky bacon and egg sandwiches are especially popular.

Energy-optimised

The machine room at QiZiNi is equipped with a frequency-controlled rotary screw compressor plus two type ASD 50 fixed-speed rotary screw compressors from KAESER, all of which are controlled via a KAESER SIGMA AIR MANAGER master controller for maximum energy efficiency. The unique 3-D Advanced Control continuously analyses the relationship between individual parameters (e.g. switching vs control efficiency) and predictively calculates the most energy-efficient operation from the many options available, thereby taking into account not only the number of starts and stops, but also idling and frequency converter losses and pressure flexibility. This serves to optimise the pressure performance of the entire compressed air system and reduce the average pressure level, whilst guaranteeing the energy efficiency of

the whole air station. "Because maximising our energy savings is an issue close to our hearts, we opted for compressors equipped with a heat recovery system. We are planning a special project to determine how best to harness the potential this offers us."

Rapid service

Asked why both QiZiNi facilities chose to go with KAESER compressors, Henk Blankenstijn replies: "KAESER is a supplier we feel we can always depend on. Reliability is a hugely important factor for us; that's why we opted for a redundant compressor configuration, because it leaves us the option of expanding it further later on. We have always had positive experiences when it comes to dealing with KAESER. They offer a professional service organisation and their products are extremely durable. All in all, we are very satisfied indeed."

On the right are the two ASD 50 rotary screw compressors from KAESER. To the left of each compressor (left side of image) stands a KAESER DC 50 desiccant dryer and ACT 50 activated carbon filter.

"Reliability and durability are important factors for us when it comes to purchasing new compressors," says Head of Maintenance Henk Blankenstijn.



The production of sandwiches, paninis and wraps is principally a manual process and is difficult to automate.



A reduction in CO₂ emissions thanks to advanced compressor technology

Contracting for a sustainable future

“Ecology is the future” is the simple, yet positive and optimistic guiding principle that motivates the PRETTL Group. It is a maxim that this family-run group of companies from the historic German region of Swabia takes very seriously, implementing their sustainability activities on a global level across multiple branches and individual companies. With a comprehensive energy management system first introduced in 2016, the holding company has been working towards the ambitious goal of achieving CO₂ neutrality, which it plans to roll out on a group-wide basis over the coming years.

This automotive supplier manufactures customised vehicle electrical systems, coils, valves and control elements.

The cornerstone of the PRETTL Group was established in the Swabian town of Pfullingen in 1953, with the founding of the Franz W. PRETTL metalworking company. Today, the group of businesses gathered under the umbrella of PRETTL Production Holdings, PRETTL Investment Holdings and PRETTL Industrial Holdings accounts for 10,000 employees across 40 individual companies and spreads across the entire globe. Now run by third-generation shareholders Willi and Johannes Prettl, the PRETTL Group is active in the fields of automotive, electronics, energy, components & systems and strategic acquisitions. Around

half of the group's turnover is generated in the automotive sector, where firms such as PRETTL GmbH Magnet- und Schaltertechnik – or in English, PRETTL Magnetic and Switching Technology Ltd – specialise in the manufacture of customised vehicle electrical systems, injection systems, coils, valves, control elements and sensors.

KPIs for sustainability

The energy management system was first introduced in 2016, with the aim of creating a sustainable and environmentally friendly operation. “In creating this system, we laid the foundations necessary to allow us to

employ professional methods and strategies for analysing and evaluating the overall energy consumption of the PRETTL Group – with the aim of reducing this to sustainable levels within a calculable period of time,” declares Peter Bley, PRETTL's Energy Management Officer. “Our goal over the coming years is to achieve CO₂ neutrality, for which we have adopted the slogan *PRETTL GO ZERO*”.

The first step towards realisation of their new sustainability goals began with the procurement of energy-efficient machines and systems. Naturally, this included the

compressed air equipment. When, in 2019, the time came to replace their ageing, energy-hungry compressors with a modern compressed air station, PRETTL GmbH Magnet- und Schaltertechnik sought to find high-efficiency products that would from the outset offer clear reductions in both energy costs and emissions in comparison to the outgoing machinery. They also wanted to install a heat recovery system, so as to be able to reuse heat energy from the compressors for heating their office spaces.

Wanted: Reliability with flexibility

At the PRETTL GmbH Magnet- und Schaltertechnik plant, where over 40 interlinked production systems operate in production halls with a combined area of 3000 m², each of the processes involved requires compressed air to drive pneumatic elements and cylinders. Availability issues are not an option for this automotive supplier, according to Project Engineer Jochen Dümmler, since such problems would impact upon them all the more severely for their systems being interlinked. It also had to be borne in mind that strong fluctuations were an intrinsic feature of their compressed air demand, since numerous systems and machines are only operated temporarily in the halls for the purposes of testing, after which they are then transferred to other locations. It was therefore important for the new systems to offer a high degree of flexibility.

Following a comprehensive ADA (Air Demand Analysis) and consultation with KAESER field representatives, three type ASD 50 rotary screw compressors (flow rate 4.58 m³/min, max. gauge pressure 8.5 bar, air-cooled with integrated heat recovery) were installed, which – thanks to their SIGMA PROFILE rotors and innovative drive concept – deliver improved performance, reliability and energy efficiency. Two highly efficient TE 142 refrigeration dryers were selected to provide the necessary compressed air treatment and the complete ensemble is controlled and monitored by a SIGMA AIR MANAGER master controller.

The question of space

Space restrictions meant that the compressor station could not be installed inside any of the production halls, which led management to opt for a containerised solution, located outdoors. Not only the compressors, but also the SIGMA AIR MANAGER 4.0 were installed in this fashion. By means of remote monitoring, the master controller ensures the highest possible level of compressed air availability; it also serves to conduct efficiency analyses and initiate service requests.

Purchase or contracting?

Once the decision had been made to choose KAESER, Energy Management

Officer Peter Bley had another choice to make: outright purchase or contracting? The advantages of KAESER's contracting concept, SIGMA AIR UTILITY, are clear: with this model, the user purchases a contractually agreed volume of compressed air, treated to a predefined quality level, directly from the supplier and therefore does not have to be concerned about any of the costs and inconvenience associated with repairs, service and maintenance, etc. – these aspects are taken care of by the operator. This was ultimately the path chosen by PRETTL. In addition to the cost benefits associated with opting for a contracting model, there are also clear environmental benefits to be gained from permanent monitoring of efficiency, which is continuously optimised to achieve best possible performance.

Peter Bley and Jochen Dümmler are more than satisfied with the new air station, which supports their drive for sustainability and environmental protection through the application of advanced technology. “Our latest energy-related KPIs show us that, thanks to the new air station, our power consumption for compressed air generation is now 80,000 kWh lower than it was the previous year – which equates to a CO₂ reduction of 48 tonnes.”



Our two main objectives were sustainability and flexibility.

The three ASD 50 rotary screw compressors are installed in a container, along with a SIGMA AIR MANAGER 4.0 master controller, which controls the entire station at the highest levels of efficiency and in constant contact with the KAESER Service Centre.

The new EBS 410 rotary screw blower

Maximum efficiency, minimal space requirement

Flow rate 10 to 41 m³/min, pressure differential up to 1.1 bar

Slip-free

synchronous reluctance motor

Combines all the advantages of high-efficiency permanent magnet motors with the benefits of robust, maintenance-friendly asynchronous motors



High-performance and ready-to-run

Complete machine including controller and frequency converter or star-delta starter



Compact footprint

With a compact footprint of only 2.2 m² (C version), units can be installed side-by-side

Maximum efficiency

Up to 35% more efficient than conventional rotary lobe blowers, thanks to Sigma Profile rotors and high-efficiency IES2 / IE4 drive motors

SIGMA PROFILE

World-renowned rotary screw technology from KAESER now available for the low-pressure range



KAESER KOMPRESSOREN – More compressed air for less energy