KAESER COMPRESSORS®

KAESER report

A magazine for the production industry

1/21

Digital transformation in partnership with KAESER

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Editorial

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Editorial fehlt noch

Maximising energy efficiency in circuit board production, thanks to a new compressed air station

Making connections with Richter

Two KAESER rotary screw compressors ensure maximum energy efficiency for the company's compressed air supply. Deep in discussion (from left to right): Bernd Zimmermann (distributor), Manuel Müller (Richter), Tobias Richter (Richter).

Compressed air is also used in Quality Assurance, in this case for powering the high-tech testing machine.

Everyday life in the twenty-first century is awash with electrical devices – from smartphones to computer keyboards, LED lighting systems and even cars – that contain one or more printed circuit boards. But do any of us truly understand what this term actually refers to? Fundamentally, a circuit board is simply a mounting plate which serves as a carrier for the mechanical fixing and electrical connection of electronic components. Yet the manufacturing process behind these vital pieces of equipment demands a multitude of individual processing stages and exceptional expertise.

Richter Elektronik, located in the North Rhine-Westphalia town of Schmallenberg, works in close partnership with its clients to create highly customised printed circuit boards (PCBs) that cover the complete spectrum of customer requirements, from quick samples to reliable series production. The possibilities range from simple, double-sided circuit boards to complex, multilayer versions. Understanding that the process of creating quality PCBs begins well before the production phase, Richter also places great importance on quality advice from the very outset of the development phase.

The complex production line down which each circuit board travels through the manufacturing process is approximately 1.5 km long. As you can imagine, a great deal happens along the way: the boards are drilled and milled in the mechanical production stage, through-hole plated and electroplated during the chemical processing phase, then coated with a light-sensitive film using precision photolithography and, finally, etched, lacquered and applied with the requisite soldering surface. At the end of this series of processes emerges a completed circuit board with high-precision electrical connections.

Multi-purpose compressed air

Compressed air plays a vitally important role throughout the entire process; in fact, every piece of automated equipment, every treatment system and every vacuum application is completely reliant upon it. For example, when drilling and milling during the mechanical production phase, compressed air is used to ensure that the high-performance spindles are supported without friction by means of an air cushion. When it comes to the photolithography, compressed air is used to blow the precision optics clean so that the film can be applied without errors – an essential prerequisite before further treatment of the circuit board can take place. Almost every workstation involved in the subsequent chemical processing also uses compressed air. Last but not least, compressed air plays a key role in Quality Assurance, namely with regard to the high-tech testing machine. Here, eight test arms simultaneously check every single connection for functionality with an extreme degree of precision, at breathtaking speed and with total reliability, thereby ensuring that only boards with completely flawless connections leave the production line.

Energy efficiency is the maxim

Sustainable and resource-friendly plant operation is of the highest priority to the management at Richter Elektronik. A permanently installed energy monitoring system continuously checks energy consumption within the business and helps to identify further energy savings potential. Based on the figures available to him from this insightful system, Manuel Müller – Energy Management Officer at Richter and also responsible for the plant's infrastructure – recognised that a new, state-of-the-art compressed air station could realise huge savings potential.

Initially, the plan was only to replace an older compressor which had run up a high number of operating hours, in order to mitigate a potential breakdown due to its age. However, a joint analysis with KAESER quickly revealed potential savings that were nothing short of huge. There was another compressor which, whilst having fewer operating hours, was no longer energy efficient compared to the very latest models available on the market. The decision was taken to replace these two machines with an ASD 35 (max. gauge pressure 8.5 bar, max. flow rate 3.16 m³/min) and an ASD 40 (max. gauge pressure 8.5 bar, max. flow rate 3.92 m³/min) rotary screw compressor.

Numerous production machines rely on compressed air.

The production line down which the circuit boards travel is approx. 1.5 km long and comprises many different stages of production.

Richter Elektronik specialises in the manufacture of custom-built printed circuit boards.

Further analysis now revealed that the existing master controller was also far from efficient. This controller often activated two compressors at virtually the same time, one of which would then immediately revert to idle. The solution here was to install a state-of-the-art controller, in the form of the SIGMA AIR MANAGER 4.0 which, thanks to its 3-Dadvanced Control, permanently analyses all available operating data, simulates a variety of operating scenarios and then selects the most energy-efficient combination of compressors to suit the actual operating conditions.

Once it had been installed and commissioned, the energy monitoring function of the SIGMA AIR MANAGER 4.0 demonstrated that an additional, smaller compressor would be of significant benefit, in order to cover the reduced compressed air demand at nights and over the weekends. This solution would eliminate the frequent, unnecessary Load-Idle-Shutdown switching cycles that were being activated up to three times an hour during these periods. "Permanent analysis of the network, as made possible with the SIGMA AIR MANAGER 4.0, was not something we had been able to perform before," explains Manuel Müller. Now, a frequency-controlled SK 22 SFC rotary screw compressor from KAESER takes over the supply of compressed air during these periods of reduced demand, thereby reliably providing only as much air as is actually required.

These new compressed air systems introduced as part of their modernisation programme have saved Richter 25% of their previous electricity costs. Not only this, but energy-saving and CO_2-reduction measures such as those taken by the company are eligible for a subsidy from the Federal Office of Economics and Export Control amounting to 40% of the initial investment costs. Managing Director Tobias Richter is extremely pleased with the outcome: "Thanks to the resulting energy savings, we've been able to amortise the costs of our compressed air system modernisation in a very short time." With evident satisfaction he adds, "Even modest investment in infrastructure and systems technology can pay off very quickly."

> As we discovered with our compressed air station from KAESER KOMPRESSOREN, even modest investment can pay off very quickly.
>
> *(Tobias Richter, Managing Director)*

Image: AdobeStock

The automotive industry faces numerous challenges on its road ahead to the future, including the continued reduction of CO_2 emissions, increased vehicle safety and the digital networking of fleets. These objectives not only demand exceptional flexibility and innovative thinking from today's automotive manufacturers when it comes to product development, but also require meticulous cost control for all value chains and internal processes.
It was this drive that led ZF Friedrichshafen AG in Eitorf to choose KAESER's contracting model – a solution which guarantees a dependable supply of quality compressed air that operates independently and "in the background", whilst at the same time keeps a close eye on operating costs and constantly looks for optimisation opportunities.

KAESER contracting and a heat recovery system for ZF Friedrichshafen AG

Huge dual energy savings

The ZF technology group employs 160,000 people in 260 locations and 41 countries throughout the world. Specialising in the production of mobility systems for cars, commercial vehicles and industrial technology, the company offers a broad and unique product portfolio encompassing system solutions that enable vehicles to see, think and act – thereby making them safer, more efficient and easier to operate. Located in the North Rhine-Westphalia region of Germany, the ZF facility in Eitorf is responsible for the manufacture of active and passive shock absorbers in the field of vehicle chassis technology.

Modernisation with cost control

The success of a technology company hinges on its ability to innovate; it must offer products and services in tune with the demands of an ever more globalised market. This same global market therefore has a strong influence on local facilities and their ability to control costs – a principle well known for putting automotive suppliers under considerable pressure. Hence, it is becoming increasingly important for companies in this segment to maintain an overview of all cost factors, at all times. It was with this knowledge in mind that ZF initiated the necessary

At its Eitorf facility, ZF manufactures active and passive shock absorbers for cars, HGVs and commercial vehicles.

Image: ZF Friedrichshafen AG

Compressed air plays a key role in the production process at ZF Eitorf.

Manuel Baumgarten (ZF Eitorf) on the right and Norbert Hages (KAESER-Bochum branch), left, discuss the significant energy savings delivered thanks to the new air station.

modernisation of its ageing compressed air station at Eitorf. "It began with the recognition that we needed to modernise," explains Manuel Baumgarten, responsible for technical services and maintenance at the Eitorf facility, "because when we started to look at the situation seven years ago, it was apparent that all of the compressors at the site were outdated. This meant that not just maintenance and repair costs, but also energy consumption, were all relatively high."

At that point, in order to allow a comprehensive overview of all available options, the company began to conduct exhaustive audits of their compressed air consumption. These yielded precise information regarding just how excessively high the plant's energy utilisation was, as well as what the requirements for the new systems would be in terms of flow rate, pressure level and power consumption. With these figures in hand, KAESER's team of experts was able to demonstrate how new KAESER rotary screw compressors could deliver significant energy savings. Moreover, centralisation of the compressors, which were previously installed separately throughout the site, combined with the use of a master controller to ensure optimal and efficient interplay between all components in the new air station, opened up further savings potential.

Following extensive analysis and subsequent calculations, the decision was made in favour of three DSD series rotary screw compressors (a DSD 172, DSD 201 and a DSD 202), to cover the significantly higher air demand during the week (45 m³/min), whilst two smaller CSD 85 rotary screw compressors running alternately take care of the lower compressed air demand at weekends. A SIGMA AIR MANAGER 4.0 master controller serves as the central nervous system of the entire station and assures optimum performance and efficiency around the clock.

KAESER's SIGMA AIR UTILITY contracting model ensures full compressed air cost transparency in contractually agreed volumes.

All images: ZF Friedrichshafen AG

Meanwhile, four energy-saving SECOTEC TF 251 refrigeration dryers from KAESER provide dependable compressed air drying. The latest energy analysis shows that annual power consumption costs for the new air station compared to the old one are around € 113,000 lower, whilst maintenance savings amount to some € 25,000 per year. Yet there was further energy savings potential to be tapped into through the use of heat exchangers to recover the heat energy generated by the compressors, thereby allowing the burden on the company's existing hot water system to be reduced. Today, this heat energy is used for heating the rinsing baths in the paint shop, resulting in additional annual cost savings of € 34,000. Therefore, if using the energy consumption of a typical family household as a comparison, this means that ZF is saving an annual equivalent of 40 households' worth of energy thanks to the heat recovery system, whilst total CO_2 savings amount to some 1000 tonnes per year.

Contracting: the ideal solution

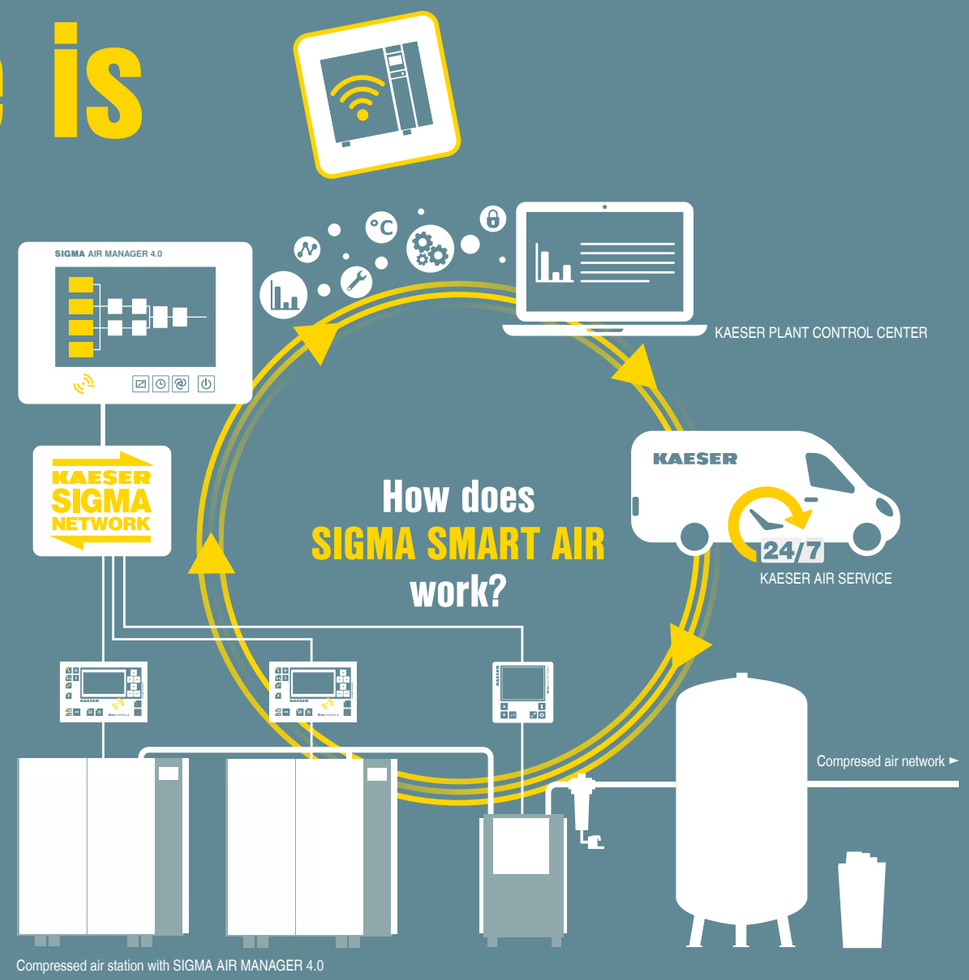
When it came to cost control, however, it turned out that the experts at KAESER still had one last ace up their collective sleeve. Why burden the company with high investment costs if there is an alternative and better way to achieve the same benefits? With KAESER's SIGMA AIR UTILITY contracting concept, the user simply purchases a contractually agreed volume of compressed air at a predefined quality class and therefore does not even need to go to the trouble of purchasing the equipment. Servicing costs and the risk of expensive repair work become a thing of the past. In addition to the cost control advantages that contracting has to offer, this model also contributes to environmental sustainability, since the efficiency level of the entire station is constantly monitored and controlled with a view to achieving maximum energy efficiency. Manuel Baumgarten is delighted with the results: "The station has proven even more efficient than initial calculations suggested. We don't have to worry about a thing – everything is taken care of and the compressed air supply is simply there whenever we need it!"

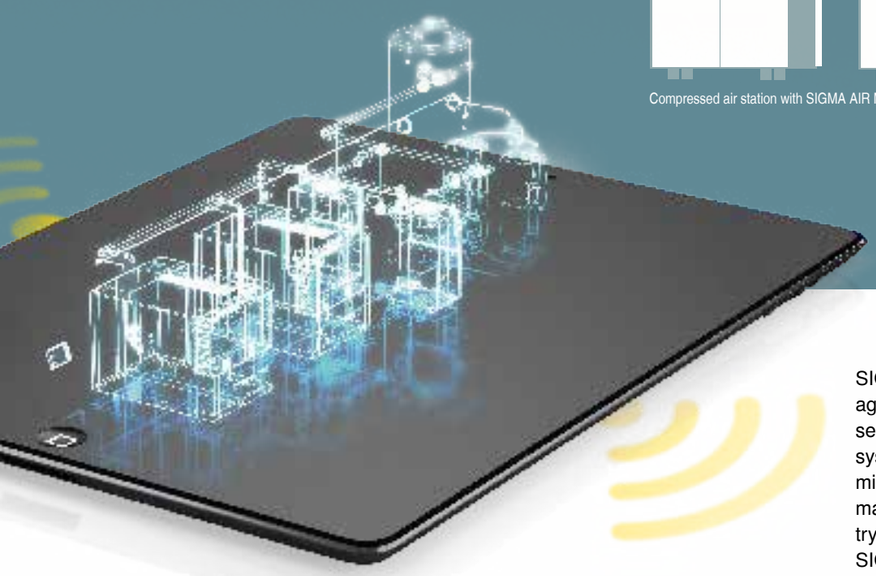
> We don't have to worry about a thing – everything is taken care of and the compressed air supply is simply there whenever we need it!
>
> *(Manuel Baumgarten, ZF Eitorf)*

New, all-in-one service package from KAESER for total peace of mind

The future is SMART

So, it's impossible to predict the future? As it happens, KAESER can prove otherwise. With our new SIGMA SMART AIR service concept, we can plan the perfect moment to service your compressed air station. The aim of pre-scheduling maintenance work is to maximise energy efficiency and compressed air availability, with the result of ensuring lowest possible servicing costs. If that sounds to you like you can benefit from more streamlined service processes, increased economic advantages and a positive environmental contribution, that's exactly what we had in mind...





The combination of remote diagnostics and needs-based, predictive maintenance assures maximum supply dependability and lowest possible life-cycle costs.

SIGMA SMART AIR is a new service package from KAESER, offering an all-in-one service solution for your compressed air system and guaranteeing total peace of mind for all servicing matters – including maintenance and repairs. In addition to entry into the world of predictive maintenance, SIGMA SMART AIR supports the step-by-step digitalisation of the customer's compressed air station. KAESER delivers and supports the company's entire compressed air supply, 24 hours a day, 365 days a year.

And the best part is that you pay only for what you actually use.

At the heart of this comprehensive service package lies the SIGMA AIR MANAGER 4.0, connected to the SIGMA NETWORK and capable of providing operating, service and energy consumption data in real-time – information that provides the key to predictive maintenance. Process data are encrypted and transferred in real-time via a radio modem; the advantage of this solution is that the customer network remains untouched and sensitive data are protected. The transferred data are permanently monitored and analysed in the KAESER PLANT CONTROL CENTER. This consequently not only helps to minimise compressed air downtime, and of course the associated impact on production, but also ensures that the system operates at peak performance and efficiency throughout its entire life-cycle.

SIGMA SMART AIR is the new, all-in-one service package from KAESER for total peace of mind.

Minimise costs, maximise transparency

Real-time data management enables expert knowledge to be paired with service forecasting. This combination of remote diagnostics and needs-based, predictive maintenance assures maximum supply dependability and lowest possible life-cycle costs. No additional costs are incurred by the customer, either for the network technology or for the required sensors – KAESER supplies all of the necessary technology for the entire term of the contract.

Furthermore, there is no need to worry about unplanned costs! All costs are fully transparent, since the service price is based on the volume of compressed air that is actually generated. Billing is similar to that for a conventional electricity or gas bill – the customer is charged simply according to the amount of compressed air generated. The price per cubic metre of compressed air remains fixed for the duration of the contract, thereby ensuring that compressed air costs remain predictable and transparent at all times.

In addition, KAESER offers the option of digitalising both existing and newly planned compressed air systems without the need for additional investment.

The benefits:

- Predictable and transparent service costs
- Enhanced service scheduling
- No costs or administrative resources required for maintenance or servicing
- Significantly reduced in-house effort required for compressed air station operation
- Rapid assistance in the event of unforeseen situations

CMI Guatemala and KAESER: Years of customer satisfaction

A world of impeccable taste

The product portfolio of Corporación Multi Inversiones includes flour mills such as Industria Harinera.

Don Juan Bautista Gutiérrez, founder of CMI, was a businessman, visionary, leader and entrepreneur. In 1902 he emigrated from Spain to Guatemala, where, in 1920, he started a small shop in the town of San Cristóbal Totonicapán. Sixteen years later, he established Molino Excelsior and thereby laid the foundation for today's CMI (Corporación Multi Inversiones), a family-owned multinational company of Central American origin.

CMI today is one of the most important business groups in the region, active in 14 countries. Under the leadership of presidents Juan Luis Bosch and Juan José Gutiérrez respectively, the two main arms of the operation are CMI Capital and CMI Food; the former is involved in renewable energy and real estate projects, whilst the latter manufactures foodstuffs such as noodles, sauces and biscuits, operates poultry and pork-processing facilities, owns restaurants and, last but not least, produces wheat flour and corn flour. Given that flour mills require both compressed air and blower air for their operations, it should be no surprise that CMI and KAESER COMPRESORES Guatemala enjoy a close and long-standing business relationship. In the early days, the focus was initially on improving existing compressed air stations, with the aim of enhancing their efficiency and performance through modern, innovative solutions. Then, in 2017, collaboration stepped up a gear, when the company procured a variety of blower packages for its Industria Harinera plant. Most recently, in 2019, work started on a third collaborative flour mill project, which will later involve the installation of a low-pressure air system.

During one of our recent visits to the company, we took the opportunity to ask our contact partner – Alberto Fischbach, Maintenance Manager at Industria Harinera – a few questions and to gain further insight into what makes the KAESER collaboration so special:

All images: CMI Guatemala

The tailor-made air station for Industria Harinera supplied by KAESER COMPRESORES met – and exceeded – all expectations.

How many mills does CMI operate and in which countries are they located?
Completion of the current new-build project will bring the total up to nine: three here in Guatemala, one in Mexico, two in El Salvador and one each in Nicaragua, Costa Rica and the Dominican Republic.

How long have you been familiar with the KAESER brand and what's your opinion of the products?
I've known the brand for 12 years. In my opinion, KAESER is a world-renowned German company that offers the most efficient and dependable equipment available on the market.

What's been your experience with the KAESER team and what has impressed you most when collaborating with them?
We first had contact with KAESER back in 2008, when we participated in an energy-saving training course for compressed air applications. After that we started this project, with the aim of modernising individual components within the air station, in order to reduce energy consumption at our Industria Harinera plant. Our core focus was on saving energy, but high compressed air quality was also very important to us. Right from the outset, a team of consultants and engineers from KAESER COMPRESORES Guatemala was by our side with advice and assistance every step of the way. The solution they proposed – type AS 20 and ASD 40 rotary screw compressors, plus energy-saving SECOTEC TD 76 refrigeration dryers and various KAESER Filter products – was tailor-made for our needs. We were extremely satisfied with the results of the project; it was obvious from the moment the system was commissioned that not only had both of our key goals been achieved, but that our expectations had been exceeded.

Since we were more than satisfied with the outcome of that project, we contacted KAESER again in 2017, this time to investigate the pneumatic conveying of cereal grains at our Industria Harinera plant. Just as before, the committed KAESER engineers came up with tailor-made solutions, met our requirements and exceeded our expectations. KAESER Service particularly impressed us with their spare parts procurement, customer service and technical support. We currently have six KAESER Compact rotary lobe blowers of types CB 131 C, BB 69 C and EB 421 C in operation at that plant and are very pleased with their reliability and energy efficiency. As a result of this success, we are planning to procure five additional blowers for installation at a new mill facility which is currently under construction. I'm very satisfied indeed with our collaboration with KAESER, for a whole host of reasons: the level of commitment from employees, proactive support, the quality of their technical solutions, the technical expertise and, above all, the dependability of their machines and systems.

> We have been extremely satisfied with our collaboration with KAESER for many years now.
>
> *(Alberto Fischbach, Maintenance Manager)*

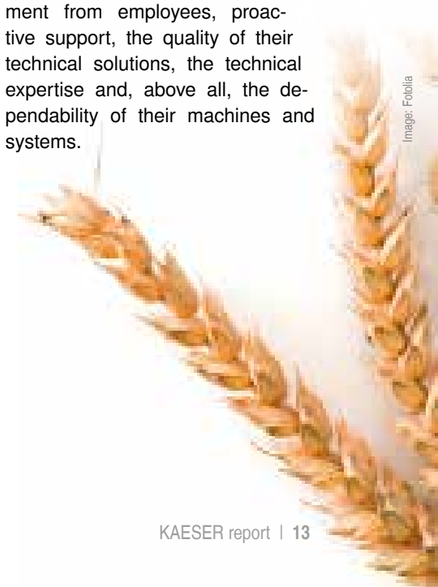


Image: Fotolia

Expanding the machine park at Germany's Federal Agency for Technical Relief

M 59 PE – Emergency assistance specialist

Civic emergency relief operations depend on compressed air. Frequently, they also require an electrical power supply for their special equipment. The new all-rounder from KAESER's road-going range of portable rotary screw compressors not only delivers more compressed air for less energy, but can also be specified with an optional integrated generator, thereby transforming it into a compact and convenient power plant. The associated flexibility, functionality, versatility and sustainability of the overall package convinced the German Federal Agency for Technical Relief to expand its equipment park with these innovative systems from KAESER's tried and tested MOBILAIR series.

The demands that Germany's Federal Agency for Technical Relief (THW in German) places on its fleet of mobile compressors are as varied as the emergencies it could find itself facing. On the one hand, compressed air is frequently required during emergency rescue operations for powering hand-held tools such as drills and breakers, in order to clear away rubble, open up access ways, etc. On the other, some rescue situations also require the use of electrically powered tools, lighting equipment and submersible pumps.

Enter the new all-rounder from KAESER KOMPRESSOREN's MOBILAIR range of portable compressors: the M 59 PE. With its optional integrated generator, this versatile compressor provides the perfect combination of compressed air and power generation.

To accommodate the vast range of potential emergency situations it may confront, the THW requires a flow rate of at least 4 m³/min at a minimum pressure of 8 bar – a walk in the park for the M 59 PE, which is available in 10 bar and 14 bar versions with flow rates from 3.8 to 4.7 m³/min (135 – 165 cfm). The integrated generator is available in one of two variants; an 8.5 kVA version or a 13 kVA version. With this variety of options, the new M 59 PE is able to meet the needs of virtually any scenario effortlessly, as and when required.

The new, road-going M 59 PE portable compressor is equipped with robust wing doors constructed of roto-moulded polyethylene.

Perfect control

The M 59 PE owes its extraordinary flexibility to its standard-equipped pV control, which allows the operator to use the maximum possible flow rate in accordance with the current set pressure. Pressure is adjusted simply and conveniently at the press of a button via the tried and tested SIGMA CONTROL SMART internal controller. Thanks to perfect interplay with the engine management system, the internal compressor controller ensures maximum compressed air availability relative to power requirement and the set operating pressure. The operator can set the maximum pressure (p) in 0.1 bar steps anywhere between 10 and 14 bar – a feature that is particularly useful when working with longer hose lines.

Environmental benefits

Given the nature of its equipment fleet, the introduction of EU Emissions Stage V legislation at the beginning of 2019 was a matter of particular importance for the THW. In the case of the M 59 PE, the limit values stipulated in this regulation are easily achieved thanks to its electronically controlled engine featuring a diesel particulate filter. The version used by the THW is further configured to run on Panolin special biodegradable oil, certified with an EU Ecolabel for its especially environmentally friendly operation. Further features of benefit to the environment include a closed floor pan, which ensures that any potential fluid leakage poses no threat of ground contamination, as well as an integrated compressed air aftercooler. As with all MOBILAIR units, the hot exhaust gases from the engine are used to evaporate any accumulating condensate.

> The ability to provide variable compressed air and power generation convinced us to add the M 59 PE portable compressor to our machine park.

Equipped to impress

Not only does this new addition to the MOBILAIR range feature the very latest technology, it also boasts a number of impressive additional features, such as a transport chassis that enables the unit to be easily hoisted onto a loading bed and securely lashed in place; like all MOBILAIR models, the M 59 PE is equipped with lifting eyes as standard. Another useful feature is the hose reel installed at the front of the machine. It holds 20 m of lightweight hose which, for added ease of operation, does not need to be fully reeled out for use. Furthermore, the integrated tool lubricator ensures correct lubrication throughout that distance for the latest-generation breakers such as those supplied within the scope of delivery to the THW, which impress with their low air demand and finely tuned start-up behaviour.

When it comes to the body colour, it does not always have to be yellow either. The PE wing doors are available in 4 special colours ex-stock. In this case for example, rather than go with its usual corporate RAL 5002 (Ultramarine Blue) colour, which is theoretically also available, the THW opted for the more readily available RAL 5017 (Traffic Blue) option, which will make ordering spare parts quicker and easier in the future. The PE wing doors provide perfect sound insulation regardless of the choice of colour, whilst the large opening angle ensures best-possible access to all components, thereby guaranteeing maximum maintenance-friendliness.

Portugal: Wastewater treatment with KAESER

Compressed air for a cleaner future

The PillAerator LP 14000 turbo blower from KAESER achieves the project's needs in full, with 25% less power consumption than the previous system.

For almost 200 years, the wastewater management sector in Portugal has had to face ever increasing challenges, brought about in large part by the rapid population growth since the beginning of the industrialisation process around the middle of the 19th century. This growth was compounded by rapid development of the textile industry in the north of the country, where many of the manufacturers are located in the region around the Ave River.

Home to approximately 700,000 people, the heavily industrialised Vale do Ave region (Valley of the Ave River) covers an area of some 1400 km² and comprises 14 municipalities in the districts of Braga and Porto. During the twentieth century, the textile industry saw strong growth in the region around the Ave River and its tributaries, due to the fact that water was required not only as a resource, but also as a means for discharging industrial wastewater. As the industry grew, so did the demand for labour, which in turn led to corresponding population growth and increased pressure on the local environment. Deterioration of the water quality in the rivers of the catchment area was therefore inevitable – in fact it became so bad that the water was deemed "not suitable for consumption" and, in some parts of Vale do Ave, even "harmful to aquatic organisms". It was clear that urgent improvement measures were needed, the implementation of which began to take shape in 1998 with the establishment of SIDVA (the Portuguese acronym for Vale do Ave Integrated Rehabilitation Project).

Extensive rehabilitation

TRATAVE is the name of the institution established that same year exclusively to manage and operate the SIDVA project, making it responsible for the drainage, purification and end use of both industrial and domestic wastewaters in the municipalities of Guimarães, Vizela, Vila Nova de Famalicão, Santo Tirso and Trofa. Its most important objectives include protecting the local ecology and improving the quality of the environment, in collaboration with local residents and businesses. The sustainable activities undertaken and encouraged by TRATAVE are credited with a significant increase in water quality and a corresponding improvement in the quality of life for the inhabitants, thereby helping to mitigate the effects of the human population and industrial activity on the region's ecosystem, which remains one of the most heavily affected in the country.

The project team at TRATAVE is extremely satisfied with the environmental friendliness and energy efficiency of the KAESER system.

Around the middle of 2020, TRATAVE took the decision to invest in modernisation of the aeration system for the biological reactors at the Serzedelo II wastewater treatment plant – a system which uses ambient air to ensure healthy growth of the microorganisms active in the clarification tanks. Seeking a low-pressure compressed air supply that would not only be completely dependable, but which would also provide the performance, energy efficiency and environmental friendliness that only the very latest technology can offer, TRATAVE turned to KAESER Portugal to implement the project – one that happened to be tailor-made for turbo blowers. PillAerator turbo blowers from KAESER were developed specifically with aeration applications in mind; equipped with an innovative magnetic bearings system, the drive system on these machines operates completely wear-free. Moreover, the combination of a directly driven, magnetic bearing rotor and an intelligent controller means that PillAerator turbo blowers are exceptionally efficient, saving up to 25% of the energy consumed by machines using conventional technologies.

Turbo control

PillAerator blowers make a significant difference when it comes to saving energy. They not only enable optimised, application-specific operation, but are also able to react quickly to changing conditions. Use of the very latest measurement technology and perfect interplay between all components allow motor power to be modulated anywhere between 15 and 100% capacity. Integrated, continuous measurement of the process air mass flow allows the delivered flow rate to be adjusted in accordance with the changing needs of the application. This makes the process simple to control and also prevents energy losses due to over-aeration.

Energy efficiency par excellence

Prior to the modernisation project, the TRATAVE air station consisted of a rotary lobe blower supplied by another manufacturer. Owing to its frequent faults and a relatively high power consumption of 400 kW, this machine was no longer fit for purpose, hence, following an intensive analysis and the decision to go with KAESER technology, a superior system design was proposed for the rejuvenated facility, delivering an air volume of 220 m³/min and pressure of 750 mbar.

As a result, the air supply for one of the plant's aeration tanks is now provided by a PillAerator LP 14000 turbo blower from KAESER (flow rate 75 – 267 m³/min, gauge working pressure 0.3 – 0.9 bar), which delivers the exact amount of air required for the process. Operating in the low-pressure range of 750 mbar with a power consumption of 300 kW, this system achieves a saving of 25% compared to its predecessor. The actual consumption figures confirm the energy savings calculated in advance by the KAESER experts, yet the system still provides the performance necessary for the treatment process.

> KAESER turbo blowers support us in achieving our environmental goals.

The new LP 14000 turbo blower supplies the aeration tanks with ambient air to promote healthy microorganism growth.

All images: TRATAVE S.A.

New compressed air station for HDS Group, the sawmill specialists

All for the love of wood

"Healthy growth is based on many factors, but chief among them are a suitable breeding ground and a nurturing environment". So goes the maxim of the HDS Group and its Managing Director Andreas Hindrichs, referring not only to the wood that their range of products is designed to process, but also, in a figurative sense, to the way in which the company has developed since it was founded in 1999.

Based in Remscheid (North Rhine-Westphalia), HDS has become a firm part of the great tradition of this historic tool-producing town, which is still home to a number of world-famous manufacturers that have helped forge its international reputation for high-quality tooling. HDS is passionate about its pursuit of "Perfection and Precision" in producing quality sawmill tools that are powerful, dependable, highly effective and resource-friendly. Yet this pursuit goes far beyond the actual manufacture of high-quality sawing tools themselves. The products designed and manufactured here are made of such high quality materials that they can be regenerated many times over. This sustainable use of materials is very much on point in today's world, both from an economic and an ecological perspective.

Since 2011, the HDS Group has been divided into three separate areas of operation, namely HDS Sawmill Tools, HDS Made-To-Order Production and HDS Engineering. The product portfolio of the HDS Sawmill Tools division covers the large majority of the tooling requirements for a modern sawmill, whilst HDS Made-To-Order Production focuses on the manufacture of components for local engineering firms based in Remscheid and its environs, as well as the provision of CNC-machine services such as lasering, grinding and milling. Finally, the high-tech HDS Engineering division designs and develops cutting tools for a global customer base, in addition to meeting the group's own tooling requirements, all of which are precision-designed for specific operating conditions.

HDS Group, located in the tool-manufacturing town of Remscheid, specialises in the production of tools for sawmills.

Many of the processing centres rely on compressed air, for example as sealing air.

Zero downtime please!

Due to the burgeoning success of the group, HDS has been expanding its premises on an almost continuous basis – each time the business ran out of space to accommodate its growing array of processing machines, it has needed to extend its facilities accordingly. By the same token, this constant development meant that the compressed air station also continually needed to expand. Since this expansion took place in various stages as and when required, HDS eventually found itself operating three outdated compressors and dryers, all from different manufacturers. Jörn Bleckmann, Head of Knife Production at HDS Group, sums up the situation the company was in: "The old system broke down frequently and we often discovered water in the compressed air lines, because the dryers were no longer powerful enough to keep up with demand." Due to the lack of available space, the air station had to be located above the rooms that house the building management systems, with the result that hot air rising from below mixed with exhaust heat from the compressors to produce considerably higher temperatures; conditions which caused frequent breakdowns in the sensitive compressors. The air system also featured an outdated master controller that controlled only two out of the three compressors, with the result that the third machine operated independently of the others. Unsurprisingly therefore, this set-up was far from ideal and did not guarantee a continuous and dependable supply of quality compressed air. Furthermore, capacity was frequently insufficient to meet the plant's growing requirements. The consequent interruptions to production were something that the HDS Group could ill afford, since virtually all of their machines and processing centres rely on the use of compressed air as sealing air (air that is used to seal a cavity by means of excess air or gas pressure, thereby providing a method of contact-free sealing). Compressed air is also used by the milling machine as cooling air and for cleaning of the spindle, not to mention for the opening and closing of covers and doors on numerous other machines, such as those in the grinding centre.

Dependable and efficient

Jörn Bleckmann summarises HDS' thoughts at the start of the planning phase for the new compressed air station: "We wanted a dependable system that would prevent further costly downtime from occurring in the future." Once the decision had been taken to replace the existing system, the next step was to identify the right partner for the job. It so happened that the company had rented a SECOTEC dryer from KAESER as a temporary replacement solution for one of the ageing and cost-intensive dryers they had been using up until then. Finding themselves impressed both with the performance of the dryer and the service they received from KAESER, Jörn Bleckmann approached the Coburg-based manufacturer in 2020 regarding a solution for the new compressed air station. First of all, KAESER's experts conducted a comprehensive and cost-free Air Demand Analysis (ADA), which took stock of the existing station and the requirements for the replacement system. With the results of this analysis in hand, they proposed a solution based on a splitting concept between three SK 25 rotary screw compressors, whilst two energy-saving SECOTEC TD refrigeration dryers would ensure efficient compressed air drying. Just as before, the new compressed air station sits 2.5 m above the room containing the building management systems, only now there are no issues with excessive temperature and the KAESER station guarantees highest possible compressed air availability.

Yet, there is even more reason to be happy: not only does the new air station save HDS Group approximately € 4000 per year in energy costs, but it has also yielded a significant annual reduction in CO_2 emissions amounting to some 14 tonnes.

KAESER's technicians are there for us whenever we need them – they have our complete confidence.

(Jörn Bleckmann, Head of Knife Production at HDS Group)

All images: HDS Group

The air station sits high above the production hall, where hot air accumulates, creating high temperatures.

Image: iStock

Innovative, paper-based packaging solutions

Plastic is ubiquitous in our everyday lives and its disposal poses a huge environmental challenge. Consequently, there is ever greater demand for alternative solutions to the use of plastic for the purposes of packaging. The family-owned Koehler Paper Group is working on the development of barrier papers with special functional coatings, which provide the paper with qualities up until now only associated with plastics and composites. The greatest advantage of innovative, paper-based packaging solutions such as these is that they can be recycled easily and environmentally responsibly via the established paper cycle.

Swapping plastic for paper

Family-owned for 8 generations, this specialist paper manufacturer from Oberkirch in Baden-Württemberg produces 500,000 tonnes of paper, cardboard and wood pulp board annually at four sites across Germany. Boasting a customer base that spans the globe, its product portfolio includes thermal paper, carbonless copy paper, decorative paper, fine paper, recycled paper, mechanical pulp board, sublimation paper and flexible packaging paper.

For some time now, the Research and Development department at Koehler has been working in partnership with the Technical University of Darmstadt on the development of, amongst other products, a functional surface coating for paper packaging, the application of which provides the material with barrier properties similar to those of plastic, thereby enabling packaging made from non-recyclable plastic to be replaced with recyclable paper. Paper with the correct barrier properties can be used to make bags and packaging for products such as soup or custard powder, flour, tea, coffee and dried pet food. The manufacturing process requires a specialised production line, in this case achieved with the installation of processing equipment dubbed Paper Machine 8 and Coating Machine 8. PM 8 alone is 150 m long; at its heart sits a so-called Yankee dryer, the largest machine-glazing cylinder of its kind in the world. It is this machine that furnishes the paper with its unique smooth finish, an important factor for its subsequent processing.

Compressed air & paper manufacture

Put simply, paper manufacture initially involves the gradual removal of water from the pulp-water mixture, which forms the basis of all paper products, so that it becomes progressively more stable and compact. A second production area then applies a coating (either functional or visual) so that the paper receives its specific properties (as a barrier for food packaging, for example). Finally, at the end of the process, the finished product is rolled up onto huge reels.

Numerous stages of the production processes described above rely on compressed air, for such purposes as water or vapour valve control, the cleaning of particulate filters, the powering of processing systems and even the unloading of HGVs. At Koehler, these applications are grouped under the term “working air” and share a constant demand pressure of 6.5 bar. Due to the large number of small, simultaneously operating consumers involved, a very low fluctuation range is essential. In order to

All images: Papierfabrik August Koehler SE

The paper machine known as PM 8 applies coatings to the paper that provide it with properties up until now only associated with plastics and composites.

Two KAESER DSD 240 rotary screw compressors ensure a dependable supply of working air at 6.5 bar, whilst two energy-efficient HYBRITEC combination dryers take care of compressed air treatment.

A DSDX 305 rotary screw compressor from KAESER provides blowing air for temporary demand peaks.

ensure a dependable and energy-efficient supply of working air for the new paper machine, the company invested in two DSD 240 KAESER rotary screw compressors with energy-saving 1:1 direct drive. These were complemented by two high-efficiency HYBRITEC combination dryers of types TI 418/602, which combine the exceptionally low pressure dew points normally associated with desiccant dryers with the energy-saving performance of latest-generation refrigeration dryers. KAESER's rotary screw compressors and HYBRITEC dryers are therefore a perfect fit for Koehler's energy-saving concept.

There are, however, a number of stages in the paper production process that require compressed air at the higher pressure of 8 bar. These include all applications where compressed air comes into direct contact with the product itself, such as when feeding paper onto the individual rollers, diverting the direction of the paper (e.g. onto the next roller), or when changing full reels, whereby a targeted blast of compressed air causes precision tearing of the paper. Here, with so-called "blowing air" applications, the aim is to cover temporary consumption peaks that can only be handled by systems with a suitably large compressed air bandwidth: a role perfectly fulfilled in this case by a DSDX 305 rotary screw compressor (flow rate 24.7 m³/min at 10 bar) from KAESER, also equipped with 1:1 direct drive. The internal SIGMA CONTROL 2 compressor controller ensures efficient control and monitoring of the compressor, whilst two energy-saving SECOTEC TF 340 refrigeration dryers provide stable pressure dew points with maximum reliability and exceptionally low life-cycle costs.

Andreas Walter, Central Systems Project Engineer at Koehler, is thrilled with the results of the new compressed air station. "One of our key objectives for the new system was to achieve significant energy savings. Paper manufacture is a highly energy-intensive business, which makes the efficiency of our systems and components an incredibly important factor. Our new air station from KAESER more than meets all of our requirements in this regard; we're absolutely delighted with it."

> The key advantages that convinced us were operational reliability, energy efficiency, service and spare parts availability.
>
> *(Andreas Walter, Central Systems Project Engineer)*

These 4.2 m wide reels hold approx. 80 km of paper.

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