

KAESER report

Spring 2019

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TRADITION & INNOVATION



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100 Years KAESER KOMPRESSOREN

100 years ago, my grandfather, Carl Kaeser Sr. – together with eight employees and two apprentices – founded a machine workshop that specialized in gear cutting and car engine overhauling. In 1947, my father, Carl Kaeser Jr., made the decision to start manufacturing the first serial production reciprocating compressors.

Today, KAESER KOMPRESSOREN SE remains a fully family-owned business that offers and markets its industrial compressed air technology products and services in over 100 countries through its own subsidiaries and exclusive sales partners. KAESER KOMPRESSOREN has remained competitive for 100 years and has been able to grow successfully through its combination of uncompromising customer orientation and constant innovation with highly motivated and expertly skilled employees and sales partners.

We are all very grateful and can look back on our 100-year history with a sense of great pride and accomplishment. Moreover, our history is not only a basis for the present and a solid foundation to enable us to look firmly and clearly to the future, but is also the basis for us to meet and overcome the ever-evolving challenges that the future has in store. Breath-taking possibilities stand before us, which, at first, may present themselves as unsolvable problems. However, we need to tackle and solve these problems, but this cannot be achieved by individual skilled people.



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



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

The solutions we seek will be found only through collaboration: with the development of the potential harbored in human communities that comes to fruition only through open and constructive co-operation between dedicated people who are free to act on their own initiative.

Digitalization, the Internet of Things (IOT), Smart Factory, networking and artificial intelligence are all helpful tools to make companies more efficient, flexible and innovative, and, ultimately, more competitive. This gives rise to completely new business models for products and services that bring significant measurable benefits to our customers.

Every era has its own challenges, potential and opportunities. The guiding principle that helped my parents and grandparents in their decisions in the past can therefore also be an inspiration to us today: set clear and innovative customer- and employee-oriented goals, and have a burning desire to achieve them.

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From a machine workshop to a global leader

KAESER KOMPRESSOREN Turns

1000

Carl Kaeser Sr. established his machine workshop in 1919. Today KAESER is a highly successful global supplier of compressors and compressed air systems that remains true to its roots.

1919: the beginning

Carl Kaeser Sr. establishes the company as a machine workshop on the 27th of June, 1919 in Coburg. It was a difficult time, fraught with instability, just a year after the end of the First World War. After starting out as a maker of spare parts for motor vehicles and engines, especially gears, he later branches out to produce specialized equipment for the glass making industry.

Through the division of Germany after the Second World War, KAESER is cut off from a large portion of its original market in the states of Thuringia and Saxony and is forced to pursue business in new markets in southern and western Germany. A decision that was to shape the company's future. KAESER's expertise in engine manufacturing, coupled with strong demand for compression equipment in the post-war economy, results in compressors being added to the product range. The first reciprocating compressor developed by KAESER is shipped in 1948. Within a few years the company's reciprocating compressor program covers the full range up to 80 hp.

Expanding the product range

Carl Kaeser Jr., the founder's son, takes the initiative for the company's next strategic departure: the development of rotary screw compressors. At the heart of every

KAESER rotary screw compressor lies the proprietary rotary screw air end with a new energy-saving rotor profile – the SIGMA profile. Manufacturing begins in 1973. Over the coming years, KAESER KOMPRESSOREN takes its place alongside the world's leading manufacturers of rotary screw compressors.

Following the acquisition of the French manufacturer Compresseurs Bernard in 1982, KAESER develops the KAESER MOBILAIR series of portable rotary screw compressors for the construction industry, initially manufactured in Lyon, France. In 1991, shortly after German reunification, KAESER acquires Geraer Kompressorenwerke, one of Germany's oldest compressor makers, and develops the OMEGA rotary lobe blower. Manufacturing starts in Gera in 1993.

With SECOTEC, KAESER develops a completely new line of energy-saving refrigerated dryers in 1994. In the same year, Germany's most advanced manufacturing facility for refrigerated dryers goes into operation in Gera.

KAESER launches the revolutionary SIGMA CONTROL compressor controller in 1998. This proprietary development,

based on industrial PC technology, reduces life cycle costs and further improves equipment availability. It has since become an integral part of KAESER rotary screw compressors. Building on the successful launch of the SIGMA CONTROL, KAESER "computerizes" the entire compressed air station in 2001. With the innovative SIGMA AIR MANAGER, the combined benefits of a state-of-the-art industrial computer and high-speed network technology are introduced into the world of compressed air technology for the first time. This paves the way for further gains in dependability, efficiency and cost transparency in the compressed air supply.

The road to expansion

Various construction projects in Germany and abroad create additional space over the years to meet the company's increasing capacity



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needs. In the spring of 2002, the new manufacturing center for portable compressors (the MOBILAIR plant) opens in Coburg. In 2004, the year begins with the official opening of the new product development center in Coburg, providing an ideal working environment for development engineers. At the opening ceremony, Thomas Kaeser, Chairman of the Managing Board, says, "Our goal is to develop and deliver innovative products that are tailored to customer needs in greater numbers and more quickly than ever before." In the same year, KAESER KOMPRESSOREN completes construction of a state-of-the-art distribution center. Key elements of this innovative facility, which revolutionizes logistic processes throughout the company, include a new, fully automated high-rack warehouse and a high-performance picking system for small parts and spares. Apart from laying the groundwork for continued

growth in production, KAESER expects the new facilities to improve on-time delivery rates and boost customer satisfaction. In 2008, KAESER opens a new plant for cladding components in Sonnefeld. It begins manufacturing panel components, doors and enclosures for rotary screw compressors.

In October 2013, the company starts construction of a new research and development center at the Gera manufacturing site. Excellence in innovation is a top priority. A steady stream of innovations keeps KAESER KOMPRESSOREN at the forefront of compressed air drying technology – amongst others.

In May 2014, KAESER initiates the transition to a smart factory approach. With the ground breaking ceremony for two new production halls for rotary screw compressors,

the future begins to take shape at the Coburg site. Another construction project is launched in Coburg in September 2015. This time it is for the research and innovation center – soon to be the incubator of new ideas and inventions. The facility is completed in late 2017 and the first employees start moving in.

Awards in Germany and at the international level

Thomas Kaeser is awarded the State Medal for outstanding contributions to the Bavarian economy in 2012. The ongoing development of innovative products, a defining feature of the company since its earliest beginnings, earns recognition and respect among the general public and industry experts alike. In 2013, the new SECOTEC TF

340 energy saving dryer is selected as a finalist for the prestigious Hermes Innovation Award, conferred by the Hanover Trade Fair to honor outstanding and trailblazing technological developments. With its innovative thermal storage system, the new dryer achieves energy savings of up to 70% compared to conventional dryers. In 2014, it is selected for *Plant Engineering* magazine's Gold Award for best product in the USA.

KAESER as an employer

As one of the largest providers of apprenticeship opportunities in its region, KAESER KOMPRESSOREN excels in training skilled personnel. KAESER apprentices and trainees regularly score top results in the Chamber of Industry and Trade examinations, both regionally and nationwide. To promote real integration within the company while simultaneously taking action to address the skills shortage,

KAESER creates 20 additional training positions for young people with refugee backgrounds in 2016.

The former youth hostel in the Ketschendorf district of Coburg is converted into a residence for KAESER apprentices from all over the world.

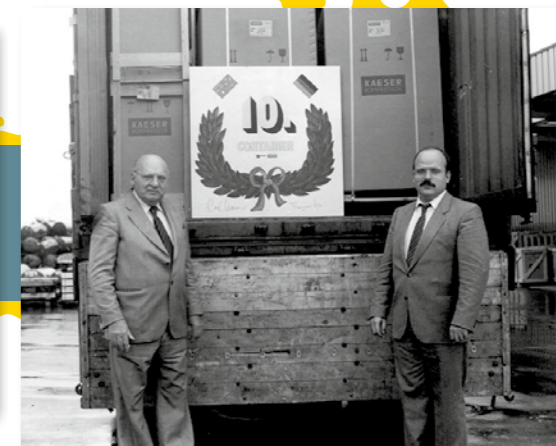
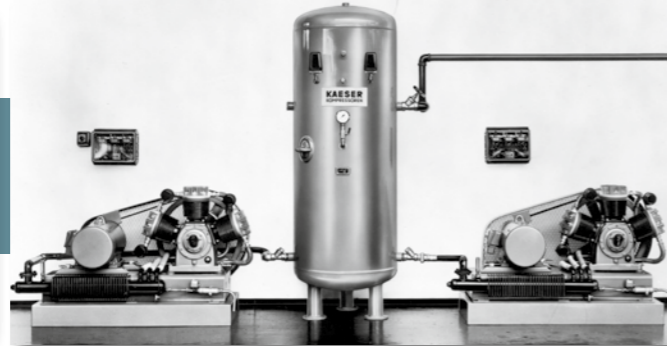
In recognition of its endeavors as a provider of in-house training opportunities, KAESER is awarded first prize in the Industry, Trade and Services category by the jury adjudicating the "Training Ace" competition in December 2016. The competition is held under the auspices of the German Federal Ministry of Economics.

Ready for the future

With over 100 subsidiaries and sales partners worldwide, the international KAESER group is present in all major industrialized countries, especially in the economic ar-

reas of Europe, North America and Asia Pacific. November 2013: With its re-incorporation as a "Societas Europaea" (SE) – a European stock company – KAESER KOMPRESSOREN takes a further step in its international strategy. The family company is now at home all over the world, offering uncompromising "Made in Germany" quality.

The managing board is comprised of the chairman, Thomas Kaeser Dipl. Wirtsch.-Ing. and Tina-Maria Vlantoussi-Kaeser Dipl.-Wirtsch.-Ing.



KAESER KOMPRESSOREN at the 2019 'Hanover Fair' – the world's preeminent trade fair for industrial technology: Hall 26 Booth C51

Integrated Industry – Industrial Intelligence

"Integrated Industry – Industrial Intelligence": that's the theme of this year's 'Hanover Fair', taking place on the 1st to the 5th of April, 2019, in Hanover, Germany. The theme was chosen to embrace the far-reaching concept of digital networking people and machines in the age of artificial intelligence.

"The focus is squarely on people. They make the decisions and set the tone," explained Jochen Köckler. With those words, the CEO of 'Deutsche Messe', underscored the role of 'Hanover Fair' as the home of industrial technology trailblazers, synonymous with progress for over seven decades. More often than not, the ideas and trends that revolutionize industry are first presented to the global public in Hanover. This is where visionaries from around the world, representing diverse industrial sectors, get together to capture synergies and to discuss and develop the solutions of the future.

The place where the future of industry is born

Six leading trade fairs and one platform: at the world's biggest industrial fair, visitors experience the full range of technical innovations, starting with A for automation, and covering every key area across the entire value chain.

Under the motto, "Air is just the beginning," ComVac, the leading international trade show for compressed air and vacuum technology, will highlight hot topics in the world of compressed air and vacuum technology, including: energy and resource management, the accelerating trend in contracting and operator models as all-round solutions, and predictive maintenance in the context of Industrie 4.0.

Key technologies for Industrie 4.0

When designing a compressed air supply system as a seamlessly integrated element in an integrated industry concept, a key factor for success or failure is the selection of the appropriate compressors and air treatment components. Get an up-close look at compressed air solutions that are more than just reliable and energy-efficient. Thanks to advanced IT integration, they can also be integrated seamlessly into Industrie 4.0 production environments. KAESER looks forward to seeing you at Booth C51 in Hall 26, where the latest

KAESER products and ideas will be showcased in almost 14,000 sq. ft. of exhibition space. For plenty of useful information and easy onsite navigation, access the 'Hanover Messe' app on your phone (available on the 'Hanover Fair' website).

To achieve truly seamless integration of the compressed air supply into integrated industry environments, KAESER KOMPRESSOREN links machines using the SIGMA NETWORK and the SIGMA AIR MANAGER 4.0 master controller. This advanced controller provides optimal management of the entire compressed air station. It functions as the station's brain and represents the key technology for using services in the Industrie 4.0 world of tomorrow. This compressed air management system uses adaptive 3-D^{advanced} Control to make compressed air production and treatment smarter, more efficient and more secure than ever before. 3-D^{advanced} Control continually analyses all operating data, simulates alternative actions and calculates the

SIGMA AIR MANAGER 4.0 KAESER SIGMA NETWORK
KEY TECHNOLOGY FOR INDUSTRIE 4.0 INTEGRATED INDUSTRY
KAESER SIGMA NETWORK
IOT CLIENT
PREDICTIVE



perfect combination of compressors. The result: unprecedented energy efficiency. Thanks to easy and intuitive operation, clear visualization and analysis functionality, users have a full overview at all times – from any PC. Combined with SIGMA AIR MANAGER 4.0, the KAESER SIGMA NETWORK offers a perfectly coordinated and secure infrastructure for intelligent Industrie 4.0 services. Based on Ethernet technology, the powerful SIGMA NETWORK is a closed and secure network specifically developed to support optimal monitoring and coordinated control of compressed air station components. Rounding off the KAESER Industrie 4.0 package is SIGMA SMART AIR. This innovative KAESER KOMPRESSOREN service delivers predictive maintenance combined with maximum energy efficiency and compressed air availability, far exceeding the capabilities of previous systems. This ensures real-time availability of operating, service and energy data – an essential prerequisite for making the transition

from compressed air system maintenance based on scheduled service intervals to a predictive maintenance concept – this greatly reduces the life cycle costs for the compressed air supply.

Maximum energy efficiency

To learn how to achieve maximum cost effectiveness and see the modern, high-efficiency rotary screw compressors that can achieve this, visit the KAESER booth in Hanover. You'll get a close look at the innovative water-cooled ESD rotary screw compressor (flow rates: 212-1600 cfm), the DSD/DSDX (141-1200 cfm) and the FSD (353-2154 cfm). These systems offer the most cost-effective performance of any fluid-injected rotary screw compressors on the market. Also on display: the CSDX SFC (flow rate: 39-618 cfm), featuring a future-ready, energy-efficient synchronous reluctance motor and speed control – in series production from the end of 2018. From the FSG series, our largest line of oil-free rotary screw compressors, fair visitors

will see the new FSG with i.HOC. The patented KAESER i.HOC rotation dryer utilizes 100% of the compression heat. With full-flow regeneration, it reliably delivers flow rates of up to 1766 cfm and low pressure dew points at ambient temperatures of up to 113 °F – with no need for electric heating or additional cooling of the regeneration air. We have further expanded our energy-saving SECOTEC series, featuring the innovative latent heat storage system, with the addition of several new models, extending the output range up to 3178 cfm for the first time. At the 'Hanover Messe' we will be presenting the SECOTEC TG, which will be available on the market as of July/August 2019. To learn more about our services and product portfolio, come and talk to the KAESER KOMPRESSOREN compressed air experts!

We look forward to your visit and to telling you all about the latest technologies and coming trends.



FACC, Austria's largest aviation company, has risen to become a global player with high-tech within a few decades. The high-strength lightweight components are in great demand – as a result, today hardly any aircraft is delivered worldwide that does not contain a component from the Upper Austrians. Only compressed air that is free of oil and moisture is suitable for the application of innovative technologies.



Flying High with Clean Air

Upper Austria, long famed as the industrial heartland of the Alpine region, is now home to a rising star in a high-growth, high-tech sector. FACC, located just outside the town of Ried im Innkreis, has risen to prominence in the aviation industry. FACC began as a spin-off from the research department of Fischer, a ski manufacturer. The aviation industry discovered the expertise in material science and lightweight construction of the Austrian winter sports specialists back in the 1980s. The company's near-meteoric rise began with a development project for a supporting rod on the Airbus A300 airliner. The company's list of customers now reads like a who's who of the global aerospace industry: aircraft manufacturers such as Airbus, Boeing, Bombardier, Embraer, COMAC and Sukhoi, engine makers and their suppliers all rely on products from the

main plant in the Alps. Today the company employs 3,400 people worldwide, including 3,200 in Austria, who generate annual sales of approximately €750 million.

Key future technology: lightweight construction

The core competency of FACC is developing and manufacturing carbon composite

parts for aircraft in three main areas. Aerostructures is the division that handles wing components such as elevators, rudders and winglets. The Interiors division supplies aircraft manufacturers with passenger cabins, from ceiling panels and overhead luggage bins to side panels. The third area – the Engines & Nacelles division – specializes in engine components and enclosures.

For all developers at FACC, the top design priority is to keep component weight to an absolute minimum. The materials of choice for achieving that objective are carbon composites. FACC produces tailor-made lightweight components made up of hundreds of layers, and in some cases more than a thousand. Experts precisely calculate the stresses in advance – experienced

by an engine nacelle, for example – to determine the exact number of layers needed at every location. This results in components that combine the toughness needed for the heavy demands of aviation with the minimum achievable weight. Another advantage of carbon: there is practically no thermal expansion. "An aircraft taking off in a hot desert region will be exposed to an ambient air temperature of -58 °F just 20 minutes later," says Christopher Jell, the Senior Manager of IE & FM Engines & Nacelles. "Our carbon components handle these rapid and extreme temperature fluctuations without the slightest difficulty".

Drilling with sand

FACC has gained an excellent reputation in the market for its technical skills. A special

area of expertise is the "acoustic surface." A robot drills hundreds of thousands of approx. 1 mm-diameter holes in the inner carbon surface of an engine nacelle. The lower end of the hole opens into a honeycomb-like core of expanded aluminium. These holes have no effect on stability. However, the aluminium core has outstanding sound-absorbing qualities: meaning that the sound is damped right where it is created. A remarkable fact, instead of conventional drilling methods, the holes are made by high-pressure sandblasting.

Environmental protection and energy efficiency

The sandblasting process is the largest consumer of compressed air in FACC Plant 4 in Reichersberg. The remainder is distributed across a large number of hand tools, tensioning devices on grinding machines and other small consumers. It is absolutely essential to have a reliable and secure supply of compressed air. The KAESER experts have configured the compressed air station accordingly, ensuring that fluctuating air flow does not impact the economic efficiency of plant operations. Six fixed-speed rotary screw compressors of type DSD 201, 240 and 241 handle the baseload requirements, while peak demand is covered by a DSD 281 SFC variable-speed unit. The compressors can be switched on and off flexibly to match current demand. This task is performed by the SIGMA AIR MANAGER 4.0



The engine nacelles are hardened in the autoclave to attain their final material characteristics.



Up to 1000 or more layers of carbon composite material are combined to produce engine nacelles.



FACC manufactures engine components using lightweight construction techniques here in Reichersberg.



Top: FACC

Maximum flexibility: the lightweight construction of the engine nacelles permits ideal streamlining of the engine in line with aerodynamic conditions.

master controller with adaptive 3D pressure control. Among other functions, it ensures that the pressure never drops below the lowest permitted operating pressure as detected at the pressure sensor measurement location.

8573-1 and oil purity Class 1. The result is a residual oil content of less than 0.01 mg/m³.

The decisive factor for FACC was KAESER's ability to meet a mandatory specification, namely the ability to deliver compressed air free of oil and water.

Because the compressed air must be free of oil and water, four refrigerated dryers with energy saving control (TI 521 FE and TE 141 models), two compressed air treatment lines with activated carbon adsorber (ACT 601) and two air-main charging systems are integrated into the system to ensure delivery of water and oil-free compressed air in accordance with DIN



The compressed air treatment also applies the latest technical advances.



The SIGMA AIR MANAGER 4.0 master controller with adaptive 3D pressure control allows the individual compressors to be switched on and off as conditions require.

New MOBILAIR M171 portable compressor

Variable Pressures and Heavy Duty Site Performance

More choices in the over 400 cfm range

The current climate in heavy-duty civil and commercial construction requires productivity and flexibility in all aspects of equipment selection. Power breakers, cable-blowing and other air powered tools operate on various air pressures. To meet the needs of this market, Kaeser introduced the new Mobilair™ M171 portable compressors in the fall of 2018. Delivering 405 to 600 cfm in variable pressures, it is a great option between Kaeser's award-winning M125 and the much larger capacities of the impressive M250.

The M171 comes standard with the Sigma Control Mobil controller which provides variable pressure ranges between 85 and 205 psig. Simple to operate, it automatically adjusts the maximum air delivery in each case allowing the compressor to be precisely configured to actual demand. Additionally, Sigma Control Mobil also ensures machine-friendly start/stop operation, provides valuable operational data, and alerts users when maintenance is needed.

Kaeser also designed the M171 with a new axial condensate separator installed downstream from the compressed air aftercooler to ensure even better condensate separation performance and reduced pressure losses in the system. As before, the separated condensate is evaporated via the hot exhaust gases. Further, if the reheating option is chosen, compressed air discharge temperature can be adjusted. All of the compressed air treatment methods mentioned above can be used with a microfilter combination to produce technically oil-free air.

Many other features add to the user-friendliness of the M171 including an easy-to-read but well-protected control panel, and large-neck fuel tank with overflow protection. The heavy-duty steel chassis, galvanized steel canopy and solid steel flooring protect the Deutz diesel engine and Sigma Profile airend. In addition to the chassis-mounted models with height-adjustable tow bar, skid-mounted versions are also available.

The high capacity, cold-start battery ensure reliable operation even under extreme weather conditions. Plus, the excellent cooling features allow the M171 to operate in temperatures up to 122 °F.

The M171 also features an advanced energy-saving fan that is controlled according to operating temperature, and results in fuel savings of up to 6 percent. Users looking for efficiency, flexible pressure options and user-friendliness will find that the M171 hits the mark.



Designed to be user friendly on-site and during transport.



Images, above: Fuchs Group

The Fuchs Group – cultivating a world of good taste

Spice is the Variety of Life!

It is certainly not a new realization that food is about much more than nourishment. The experience of flavors can represent pure enjoyment while enhancing our sense of culture and lifestyle. To attain the consummate taste experience, we need the right ingredients. The goal of Fuchs Group in Lower Saxony, with its precious spices and spice mixtures, is to help turn a meal into a genuine culinary event.



Image: Fotolia

Fuchs Group is Germany's largest spice manufacturer and the world's largest privately owned company in its industry. Established by Dieter Fuchs in 1952, it is one of the biggest employers in its home region. It has its headquarters in Dissen, in the state of Lower Saxony, at the edge of the Teutoburger Wald forest region. The product portfolio covers an unparalleled selection of spices, spice mixtures, herbs, spreads, pastes, sauces, dips and many other ingredients for a healthy, creative and varied cuisine with more than 8,000 products sold in over 60 countries. Fuchs Group employs approximately 3,000 people in 10 countries on four continents. In Germany, the group has other loca-

tions in Abtswind and Hamlar (Bavaria), Melle (Lower Saxony) and Schönbrunn (Schleusegrund, Thuringia).

A tradition of partnership

So, what is the company's secret recipe for achieving maximum quality from the very start of the value chain? Careful selection of the ideal growing regions for its products and close partnerships between Fuchs Group employees and the farmers and contracting partners on the ground. The exchange of ideas and experiences and the transfer of knowledge benefits the suppliers in the growing regions – and ultimately it enables the Fuchs Group itself to ensure consistent quality.

From the life of a peppercorn

The Fuchs Group's most important pepper growing regions are in Brazil, specifically in the northern half of this gigantic South American country. Because the north of Brazil is hot, like the south, but much wetter, it is ideal for growing pepper. The pepper plant is a perennial woody climbing vine that grows on trees, reaching heights of up to 33 feet. When cultivated, the plant is generally limited to a height of 10-12 feet. The small, unremarkable flowers grow on spikes around 4 inches long, with 50 to 150 flowers per spike. After pollination, the fruits (drupes) typically ripen within 8–9 months. The various types of pepper (black, green, white and red) differ by the degree of ripe-

ness when harvested, among other factors. Quality assurance accompanies the entire process, starting in the field with the growing plant. After the harvest, the raw product is dried using the almost unlimited resource of Brazilian sunshine, available 300 days a year. This is followed by the next meticulous quality inspection. Afterwards every sack of raw product is assigned a QR code that permits tracking of "our" peppercorn every step of the way, from the field to the in-store packaging. Now the peppercorn – still whole at this point – can embark on its journey to Germany.

A special aromatic experience

Upon arrival in Dissen, the sacks of Brazilian peppercorns, along with other sacks and transport packages containing a wealth of different herbs and spice plants from all over the world, are placed in temporary storage in the 108,000 sq. ft. warehouse. Catching the powerful fragrances pervading this space, visitors inevitably feel as if they have been transported to some far-off bazaar. Amid this somewhat overwhelming but highly aromatic sensory experience, one occasionally detects a familiar scent amongst the stored sacks and containers: oregano, cinnamon, paprika, nutmeg and – of course – pepper. From the warehouse, the raw materials are transported to another

thorough quality check prior to the further processing steps. In the eight-story grinding mill tower, the various herbs and spices are cleaned, dried, ground, sieved, mixed and placed in the final packaging in which the finished product is sold.

Compressed air in the service of gourmets

Throughout the entire production process of the Fuchs Group, there is a unifying theme: compressed air. For every step in its operations, from the transport of the spices and herbs through to the cleaning, drying and grinding processes, and to control the machines and systems, the Fuchs Group needs compressed air. The company

cannot afford any bottlenecks or disruptions in the compressed air supply. The reliability and availability of this universal energy source is of paramount importance. When it was time to replace the obsolete compressors from another manufacturer due to increasingly frequent breakdowns and problems, the obvious choice was the Co-burg-based system provider KAESER. For food processing operations, compressed air must meet the highest quality standards of Class 1.4.1 under DIN ISO 8573-1. The Fuchs Group compressor room now houses all of the equipment needed for energy-efficient compressed air production in accordance with those stringent requirements: Two new-generation ASD 40 rotary screw compressors with an integrated PTG 40-25 heat recovery system and two TE 102 energy-saving refrigerated dryers. The decisive factor ensuring full compliance with



The compressed air supply meets the stringent requirements of Quality Class 1.4.1 in accordance with DIN ISO 8573-1.

Quality Class 1.4.1: the high-perfor-

mention the many friends of good cuisine, who can now rest assured that the flavor specialists in Lower Saxony will continue



Because the new compressed air system is highly efficient in terms of energy consumption, it is a perfect fit for the Fuchs Group's sustainability strategy.

mance KAESER filters connected downstream from the compressors. In the context of the company's sustainability efforts, the new system also has a significant ecological impact. This makes the employees of the Fuchs Group very happy – not to

to supply them with high-quality herbs and spices long into the future.



Compressed air is needed in every step of product processing. Shown here: material conveying.



The air in the 108,000 sq. ft. warehouse is heavy with the scents of the many herbs and spices stored there.



The air-main charging system prevents overloading the system and contamination of the compressed air network when the system is restarted.

Images left and centre: Fuchs Group



Compressed air for the Institute of Thermal Turbomachinery at the Karlsruhe Institute of Technology

The Institute of Thermal Turbomachinery at the Karlsruhe Institute of Technology (KIT) recently purchased an HSD 662 SFC rotary screw compressor system. It will help to deliver compressed air to the extensive experiment equipment and facilities in the research laboratories. For the experts from KAESER, the task of installing the new system posed substantial – but not insurmountable – challenges.



In the Service of Research

The Institute of Thermal Turbomachinery is part of the mechanical engineering department at the KIT. The institute, including its research facilities, is housed in a former experimental power station. The building, which today is used exclusively as a lab-

oratory, was planned and designed in the 1950s by the architect, furniture designer and former professor at the KIT, Egon Eiermann. Among the designs that earned Eiermann fame both in Germany and abroad were the Kaiser Wilhelm Memori-

al Church in Berlin, the German Embassy in Washington and the office building for the members of the German parliament in Bonn. Defining features of the building, with its east-west orientation, are the clear structure, expansive glass surfaces and the



The body of the compressor unit had to be guided carefully through the light shaft.

exposed steel skeleton – an unequivocally modernist design. The building in which the laboratories are currently accommodated is now a listed architectural heritage site.

Research projects at the KIT

The Institute of Thermal Turbomachinery carries out many research projects in close collaboration with partners from around the world, including universities, research institutes and companies in the turbomachinery and automotive industries. The research work conducted at the institute under Professor Hans-Jörg Bauer centers around turbomachinery, and predominantly aircraft engines, gas and steam turbines for energy production, and turbochargers used in combustion engines. The researchers conduct experiments for which they develop and implement advanced measurement techniques and also apply the latest numerical methods to simulate flow and heat transfer processes.

Key objectives of the institute's research activities are to improve the efficiency of future aircraft engines and gas turbines while

significantly reducing pollutant concentrations in the exhaust gases they produce. Numerous complex experimental setups are used to develop and evaluate new combustion concepts and cooling methods. The advanced methods used include state-of-the-art laser technology to characterize the flow patterns typical of turbomachinery and quantitative infrared thermography to detect surface temperatures. These facilities require a reliable compressed air supply. For some applications, the compressed air must be pre-heated to temperatures of up to 1562 °F.

The main requirement: constant pressure and air flow

The previous compressor system had reached the end of its service life and needed to be replaced. The requirements for the new system were as follows: it would need to provide highly consistent pressure and air flow at varying pressure levels and for fluctuating air delivery requirements. So far, so good. But there was a special challenge. The equipment had to be installed in the lower level of a listed historical building

without adequate access routes. It was immediately obvious that a standard product was out of the question. The institute was searching for a reliable partner not only to provide a modern system meeting the desired specifications, but also with the ability to design and install a system around the unique structural constraints of the building. The resulting choice: a HSD 662 SFC rotary screw compressor system from KAESER KOMPRESSOREN. It now makes up the core of the high-pressure, high-temperature system that supplies compressed air to the many research and experiment facilities of the Institute of Thermal Turbomachinery.

So, how do you put the ship into the bottle?

The main hurdle to overcome before commissioning of the system was the physical installation space. The compressor room is not much bigger than the rotary screw compressor system itself and the only access route open to the KAESER experts was through the hollow spaces below the light shafts on the outer facade. The undertaking was not unlike the proverbial placement



The rotary screw compressor system made a long and arduous journey: first, it was dismantled and lowered through the light shaft into the lower level of the building.



of a ship in a bottle. For shipping and installation, the selected system was initially dismantled into its individual components. They were then loaded onto a truck and, in a two-day process, lowered by crane into the basement through the light shafts. This was followed by assembling the components onsite in the compressor room on the lower level of the institute. The compressor system was commissioned just a week later, and has been performing its duties since August 2018 – to the complete satisfaction of the institute's management.

The HSD 662 SFC from KAESER KOMPRESSOREN was selected as the center-piece of the high-pressure, high-temperature system.

Images: KIT



After being placed in the compressor room, the components were reassembled. Since then, the compressor has been doing its valuable work to the complete satisfaction of the institute's management.

The Beauty of Water

Can water be aesthetic? Absolutely! At any rate, the German-Swiss family business Neoperl ensures that it flows in a highly aesthetic way. Neoperl products shape the water stream, regulate the flow rate and protect water from contamination. And although they can be found in use with just about every washbasin, bath or kitchen fitting, they spend their useful lives languishing in near-obscure as they are virtually invisible.

The joint Swiss/German family company Neoperl was founded in Reinach-Basel in 1959. In 1961, the Group's German headquarters, Neoperl GmbH, was established in Müllheim. The owner-managed, medium-sized business is the world's leading supplier for the plumbing industry with sales subsidiaries in every corner of the globe, wherever its customers are based.

The success story began over half a century ago. Over the years, the company has developed a wide range of sanitary products, which currently includes aerators, flow regulators, check valves, diverters, connecting hoses and shower hoses, together with various accessories. One of the milestones in the company's history was the first noise-reducing aerator, which was developed in the 1970s. During the 1980s, the Neoperl Group introduced its long-life technology and, in the 1990s, launched the world's first aerator without a wire mesh. Today, Neoperl supplies products and spare parts to the world's leading fittings manufacturers, technical OEMs and the wholesale and retail trade.

Practical and beautiful

Millions of people use Neoperl products every single day. For example, the jet regulators can be found today on virtually every outlet fitting on washbasins and bathtubs. They shape the water into a splash-free stream and make it pleasantly soft by drawing air into the flow. Moreover, they reduce the fitting's noise, help conserve water and save on energy costs.

Aesthetics also take center stage. In 2016, the product design of the Mikado aerator

pany knows the plumbing conditions on the ground like the back of its hand: water hardness, water pressure, lime content, impurities, construction methods and national standards. The products are adapted to the local conditions in the on-site production plants.

To ensure proximity to its customers throughout the world, the international company employs approximately 1800 staff in 17 countries. The extensive logistics infrastructure consists of 12 production plants in

The advantages of a SIGMA AIR UTILITY are clear: there is no investment outlay, and operating costs can be precisely calculated.

won the Red Dot Award for its extraordinary, grid-like spray pattern, formed by the geometric arrangement of individual water jets.

Different regions, different conditions

Drinking water networks have unique features in every country. With subsidiaries in the customer's country of origin, the com-

pany knows the plumbing conditions on the ground like the back of its hand: water hardness, water pressure, lime content, impurities, construction methods and national standards. The products are adapted to the local conditions in the on-site production plants.

Success needs space

The world market leader in the sanitary fittings sector has had an outstanding track record for over 50 years. This means that space is sometimes tight in the buildings on the company's 15 acre site. Therefore, the production area has been extended to





The Müllheim production site uses compressed air as an energy source for every aspect of its manufacturing operations.

include a new manufacturing hall. Since the Müllheim production site uses compressed air as an energy source for every aspect of its manufacturing operations, a dependable supply of quality compressed air with precisely defined parameters is essential. In addition, some of the compressors in the existing compressed air stations were obsolete. These also needed replacing as part of the modernization program. As a first step, an air demand analysis (ADA) was carried out to calculate the exact com-

pressed air requirements. Following numerous discussions, site inspections and telephone conferences, it soon became clear that the solution that best met Neoperl's needs and requirements was a SIGMA AIR UTILITY model. The advantages of this station are crystal clear: the customer has no capital outlay, the running costs can be calculated in the form of a fixed basic price and maintenance is covered by KAESER's service package – at zero additional cost.

Compressed air at a fixed price

Ideally customized to meet all of these criteria, the modern compressor system includes several different rotary screw compressors: one CSD 105, three CSDX 165 and one CSDX 165 SFC. Three downstream TF 340 refrigerated dryers dry the compressed air to a Class 4 pressure dew point in accordance with ISO 8573-1. The SIGMA AIR MANAGER 4.0 master controller calculates the perfect compressor combination to meet current requirements. The entire unit is housed in a container located outside the production halls. As a result, the ventilation ducts are also outside, meaning fewer pipelines were needed to set it up, while outdoor installation is better from a fire safety perspective.

Commissioned just a few months ago, the operator is already highly impressed with the new station. After just four weeks of operation, the first before-after calculation produced impressively gratifying results! Energy consumption is down by approximately 15% compared to the previous compressor system.

The KAESER SIGMA AIR UTILITY station:

Left: Interior view – configuration of the compressors and dryers.

Right: Exterior view of the station.



Premium quality craftsmanship in series production: AutoGyro GmbH, Hildesheim

The Sky's the Limit

The inventor of the gyroplane, Juan de la Cierva, came very close to realizing this dream when he took to the skies with his 'autogyro' for the first time almost one hundred years ago. Powering the rotor by means of autorotation, rather than the helicopter's use of active rotation, his invention revolutionized the world of aviation.

From a garage workshop to the world market leader

Even as a child, Otmar Birkner, the founder of AutoGyro GmbH in Hildesheim, was passionate about developing and building model aeroplanes. In his parent's garage, he laminated his own first propeller blades, made in moulds that he had deve-

loped himself. He turned his hobby into a career by establishing his own business in Gehrden in 1995, High Tech Composites (HTC), which specialized in manufacturing composite (plastic) parts, such as propeller blades. However, that was just the beginning. In 2000, the company moved to Hildesheim, where Otmar Birkner founded

AutoGyro GmbH. He teamed up with two friends to develop his first fully functional aircraft, which received a type certificate in 2004. Three years later, the first "AutoGyro" went into series production. Since then, other models gradually followed every few years: the "Calidus" in 2009 and the "Cavalon" in 2011, subsequently garnering



Approximately 90% of the components are manufactured on-site.

the Red Dot Design Award in 2012. Last year, the exceptional design of the sleek planes received yet another accolade. The “MTOsport” won the coveted “Best of the Best” 2018 Red Dot Design Award, which officially attested to the ultra-light aircraft’s “innovative symbiosis of aesthetics and function”.

On course for success

Since its foundation, the gyroplane specialist has reported steady growth and today employs a 100-strong workforce. From the first brushstroke of the draft through to the test flight, the majority of the components for the ultra-light AutoGyro (aside from the engine and a few instruments) are manufactured completely in the production facilities at Hildesheim Airfield by the highly qualified team of technicians and engineers. With sales partners in over 42 countries around the world, numerous flight schools and service locations, and the gyro factory at its Hildesheim headquarters, AutoGyro serves a worldwide network with the aim of combining safety and the gyro’s unlimited versatility for the pure joy of flying. Globally, some 3000 autogyros are deployed on a variety of missions, ranging from the Qatar Royal Guard to Australia’s “Shark Patrols” and partners for adventure trips in Namibia.

Fly like Icarus, but safely

Attracting a good deal of attention, the secret of the rotorcraft’s growing popularity lies in its innovative drive technology. Although the gyro resembles a helicopter, the rotor uses the air stream – rather than an engine – to start the rotation process passively. Known as autorotation, this generates the buoyancy of the gyroplane. The aircraft is driven by a propeller engine. Thanks to its design, the gyrocopter flies with very special and unique character-



Compressed air is used to power almost every production stage.



The gyroplane before the rotor is fitted.

istics, making it one of the safest aircraft of all. Unlike fixed-wing aircraft, there is no danger of stalling or tailspin. Even in the event of engine failure, the Autogyro retains full control capability and merely loses altitude slowly as it is still able to perform a controlled landing. Almost like no other rotorcraft, the Autogyro can even be flown in strong winds and can be used practically all year round. As extreme low speed is possible, the gyroplane is ideal for excursions and day trips. Moreover, the sky’s the limit when it comes to the design. It can be customized in any way, from a company logo to a family coat of arms or a distinctive color coating.

The company even received an unusual commission to embellish an AutoGyro with gold leaf and Swarovski stones, recalls Judith Reichardt, who is responsible for marketing and communication. Best of all, the innovative rotorcraft runs at one tenth of the cost of operating a helicopter. Depending on the road traffic regulations, in some countries you can even roll up to a service station and fill up with Super Plus fuel, Judith Reichardt adds.

“We use compressed air in all areas of production”

Ninety percent of the components are manufactured and assembled with pinpoint precision in the on-site production facilities both by hand and with state-of-the-art CNC machines. Most of the production stages require compressed air, from spray painting to grinding or pressing processes. The original compressor station includes an SK 24 and a compressor from another manufacturer, “which ultimately kept causing problems, unlike the KAESER compressor,” reports René Stecher, the factory foreman responsible for the compressed air system. A new unit was needed. Given the excellent track record of the first KAESER compressor, the obvious solution was to purchase an additional SM 12.

Four years ago, the system needed to be expanded once again since compressed air was also needed on-site for the assembly line in the plastics processing department located across the road. Two more SM 12 AIRCENTERS were installed for this purpose. A wise decision as the system now runs “smoothly and to our complete satisfaction,” according to René Stecher.



Emphasis is placed on maximum precision in the individual production stages.



The tail units are also produced in the factory at Hildesheim Airfield.



Final cockpit assembly: installation and connection of the aircraft’s avionics equipment.



The KAESER station provides the necessary supply of compressed air.

From spray painting to grinding, and from pressing processes to CNC machining, most production stages require compressed air.

Long-term customer satisfaction: Koudsy Body Works (KBW), Australia

Prestige Vehicle Repair and Customization

For over 35 years, Koudsy Body Works (KBW) has been one of the leading specialists for all kinds of vehicle repairs, including both cars and motorcycles. One glance at the photo gallery on their homepage is enough to set the pulse racing of any customer with a weakness for luxury models or vintage cars – the family business also specializes in the restoration of classic vehicles and car customisation. Extensive interior and exterior modifications are carried out with meticulous attention to detail. From black styling packs to spoiler/body kits, exhaust systems or wheel and tyre packages, automotive fans of all vehicle makes and models have choices galore!

In Australia's New South Wales, where Koudsy Body Works (KBW) is based, the family-owned business has gained an outstanding reputation, not just for its vehicle repair and restoration services, but also for its exclusive car styling packages.



Compressed air an integral part

Koudsy Body Works provides the very highest level of service. It is important to management that their team is always up-to-date with constant training and that state-of-the-art machinery is made available.

After all, the company's philosophy is that "Every vehicle will leave looking better than before." From powering air tools to the spray paint booth, compressed air is an integral part of the operation. Therefore, it is no surprise that air production is also expected to meet the very highest standards. Just over a decade ago, an aging compressed air system prompted Charles Koudsy, the manager at KBW, to inspect the entire air center and review the compressed air requirements. When it came to purchasing a new compressor that was both powerful and reliable, the obvious choice was an AIRTOWER 11 from KAESER KOMPRESSOREN. The compact compressor solution incorporates a rotary screw compressor and refrigerated dryer a single package, thus keeping space requirements to an absolute minimum – a key criteria in the vehicle repair industry.

An oldie but a goodie

Managing Director Charles Koudsy is delighted to report that the system has operated reliably for over ten years. "If our compressor doesn't work, our business doesn't



work. Especially for the spray painting side of the business, without quality and reliable compressed air, we cannot function. The air needs to always be clean with no moisture in the line. This would not only jeopardize

the quality of the finish, but would also be costly to re-do. We pride ourselves on the quality of work we do and it is essential that we use quality equipment. We have had the KAESER compressed air system for quite

some time now and it continues to operate reliably and efficiently for us," he explained.

Without compressed air, the repair shop grinds to a halt.



Compressed air is indispensable in powering the tools used in the car repair shop.



Powering the air impact wrench...



...and the spray paint booth.

The World's Largest Trade Fair



Booths FM.708/15 and FM.708/17.

This year, the 32nd iteration of the world's leading trade fair for construction machinery, building material machines, construction vehicles, equipment and mining machines will take place at the Neue Messe München exhibition grounds in Bavaria, Germany, from the 8th to the 14th of April. Some 3,400 exhibitors from almost 60 countries will present the entire range of construction machinery, vehicles and hand tools available on the market. As the leading industry hub, bauma sets the trends for the future. However, the trade fair is not just geared towards technical specialists but is also open to the public.

Huge cranes, colossal excavators and the latest technology trends – anyone who is in any way active in the construction industry will gather at bauma 2019, where the leading trade fair for construction and building materials machinery will showcase the newest trends and developments in the sector. Since its inception more than 50 years ago, bauma has garnered a reputation as the driver of innovation and success in the global construction machinery industry. This view was shared by the over 600,000 visitors from more than 200 countries who took

advantage of the platform at the last show in 2016 to do business and learn about specific key topics. The fair features live demonstrations of the machinery and its different applications. Experts advise the visitors on the latest developments, while the panel discussions and conferences keep the trade audience up to date on a wide range of subjects.

A trade fair of superlatives

It is the record exhibition space that makes bauma in Munich the world's largest fair. It occupies every hall at Neue Messe München, as well as the outdoor area, which was extended especially for the show. This equates to a huge 6,500,000 sq. ft., divided into 1,900,000 sq. ft. hall space and 4,500,000 sq. ft. outdoor space. The target markets are industry, trade, service providers in the construction and construction materials industry, plus key procurement players.

Industrie 4.0 also for portable compressors

Dubbed the 'Fourth Industrial Revolution', the phenomenon of human-machine interaction and the on-demand availability of all data will be more widely used in the civil engineering and construction sectors in the future. It is reassuring to know that KAESER's MOBILAIR portable compressors can be equipped with the necessary technology. It comes as no surprise, then, that 'The smart construction site' is a major focus at the KAESER exhibition stand.

Visitors can take an up-close look under the enclosure of the exhibits, or keep a watchful eye on remote machines in real-time using the MOBILAIR Fleet Management online tool to access current operating data, evaluate machine performance, find out when the next service is due or pinpoint their location. Moreover, the platform helps users plan operations, manage the accounts and document the work performed. Plus, remote diagnostics capability saves valuable time when servicing is required.

Innovations in the portable compressor programme

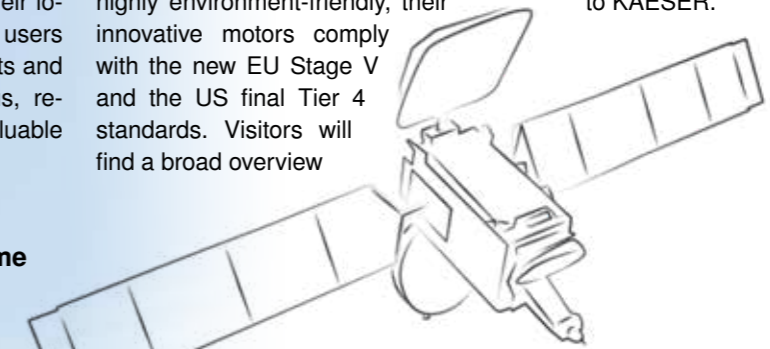
According to the new EU Stage V European emission standards, as of 2019, construction machinery will be required to comply with

even stricter statutory emission limits. For the first time, a particle number limit is also being introduced for machinery with a power range from 19 kW, necessitating exhaust after-treatment systems in the portable compressor class. How KAESER closed the gap between the market demand for light, compact, portable compressors and the additional weight of the larger diesel particulate filters and radiators required by the exhaust after-treatment, will be revealed at bauma 2019. We will be presenting the next generation of lightweight MOBILAIR portable compressors, featuring an aluminium body, and brand new design features.

The new models in the proven MOBILAIR portable compressor series – M55, M59 and M65 – will also premiere at bauma 2019; highly environment-friendly, their innovative motors comply with the new EU Stage V and the US final Tier 4 standards. Visitors will find a broad overview

of the entire KAESER MOBILAIR product range: portable compressors with flow rates from 35 to 1624 cfm and power classes from 7.5 kW to almost 450 kW, from the small, compact M13 compressor right up to the oil-free compressed air giant M500-2. When it comes to alternative drives to the diesel engine, the line-up will also include electric drive and gas engine models, while KAESER will unveil the large-scale M255 E compressor designed especially for the compressed air hire sector.

Visit bauma in Munich and discover a host of exciting innovations and technology trends. The compressed air experts from Coburg look forward to welcoming you at Booths FM.708/15 and FM.708/17. The tower of MOBILAIR MODELS with colored PE enclosures will guide your way straight to KAESER.



Networking @ MOBILAIR



Compressed air for the textile industry at ITMA 2019 in Barcelona, Hall 6, Booth D101



ITMA 2019

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Innovating the World of Textiles

The global textile and clothing industry converges every four years at a different venue in Europe for ITMA, the world's largest international textile and garment technology exhibition. In addition to technological innovations that create value in the textile chain, events and conferences provide a leading-edge platform to exchange expertise and ideas.

Since 1951, ITMA, the world's largest international textile and garment technology exhibition, has taken place every four years in different cities in the member countries (Belgium, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland and the UK). While the textile machinery exhibition was last held in the northern Italian metropolis of Milan in 2015, the organizer CEMATEX is now hosting the 18th show in the Fira de Barcelona exhibition center from the 20th to the 26th of June 2019. Insiders have long discovered the cosmopolitan capital of the Spanish region of Catalonia as one of the world's most beautiful and dynamic cities. Therefore, it is fair to say that there are plenty of good reasons to attend this year's rendezvous of the textile machinery industry in Barcelona. The ITMA exhibition program is certainly one of them.

What can we look forward to?

In keeping with the motto of the next ITMA – Innovating the World of Textiles – the trade fair will showcase cutting-edge technologies and sustainable solutions for the entire value chain of the textile and garment industry, including fibers, yarns and fabrics.

The art of sustainable innovation means that waste prevention, recycling and reduced water and electricity consumption are key qualifications for future-proof textile and garment manufacturers. Owing to the ever-increasing use of air-jet looms, the efficiency, availability and dependability of the compressed air supply play an equally important role in terms of sustainability.

The phenomenon of human-machine interaction and the resulting availability of relevant information in real-time have long since impacted the intelligent and flexible production of textile and garment manufacturers. Here too, companies are gaining ever greater competitive advantages by connecting their systems and machines to Industrie 4.0, a benefit that also enables them to maintain and extend their competitive edge on the global stage moving forward.

Ready for Industrie 4.0 with KAESER

Watch the live demonstration at the 4200 sq. ft. KAESER exhibition and find out how KAESER technology can help modernize your production facilities for the age of Industrie 4.0. The SIGMA AIR MANAGER 4.0 master controller acts as the control center for your compressed air

supply. It optimizes pressure performance, automatically adjusts compressor system air delivery to accommodate fluctuations in pressure demand, substantially optimizes energy efficiency – based on control losses, switching losses and pressure efficiency – and prepares your compressed air station for services such as predictive maintenance and advanced energy management.

Based on Ethernet technology, the SIGMA NETWORK provides the necessary communication infrastructure. This local network inside the compressed air system ensures optimal monitoring and controls the air system's components and establishes the basis for the continuous exchange of data. SIGMA SMART AIR adds the final flourish to the KAESER Industrie 4.0 package. On an unprecedented scale, this innovative service from KAESER KOMPRESSOREN paves the way for both predictive maintenance and maximum energy efficiency, while ensuring compressed air supply availability. This makes the operating, service and energy data of the compressed air system available in real-time, enabling the changeover from today's scheduled maintenance to tomorrow's predictive maintenance. The results in significantly lower life-cycle costs with regards to compressed air supply.

Save energy with KAESER

Since it is not uncommon for the compressed air required to drive the air-jet looms to account for upwards of 85 percent of total system costs, it is particularly important in the textile industry to pay close attention to optimizing compressed air efficiency. The KAESER booth in Barcelona will be showcasing the numerous high efficiency rotary screw compressor options available that are designed especially with maximum cost effectiveness in mind. There will be impressive demonstrations of KAESER's innovative water-cooled ESD series (with flow rates of 212-1600 cfm) rotary screw compressors, the DSD/DSDX series (flow rates of 141-1200 cfm) and the FSD series (flow rates of 353-2154 cfm), all of which deliver the very best in operating efficiency that the fluid-injected rotary screw compressor segment has to offer. In addition, a CSDX SFC (flow rate of 39-618 cfm) unit featuring a ground-brea-

king and power-saving synchronous reluctance motor, combined with variable speed control, will also be on display. This machine is another newcomer to the KAESER portfolio and entered series production at the end of 2018.

The line-up also includes the new FSG with i.HOC from the FSG series, our largest range of oil-free compression rotary screw compressors. The patented KAESER i.HOC dryer utilizes 100% of the available compression heat. This full-flow regeneration enables it to reliably allow flow rates of up to 1765 cfm and achieve stable pressure dew points up to an ambient temperature of 113 °F – without the need for any additional electrical heating or cooling the regeneration air.

We have added several new models to our tried-and-tested SECOTEC series with the innovative latent heat storage system, which are designed for flow rates of up to 3178 cfm. We will be presenting the SECOTEC TG, which goes on sale from July/August 2019, at ITMA.

Find out how your company can get ready for Industrie 4.0. Ask for a personal consultation with the KAESER compressed air experts. Visit KAESER KOMPRESSOREN in Hall 6, Booth D101.



Hall 6
Booth
D101

Oil-free Screw Compressors with i.HOC® dryers

Superior efficiency and air quality with integrated heat of compression (i.HOC®) dryers from 75 to 450 hp

Efficient drying

Full-flow regeneration—utilizes 100% of the available compression heat

Patented reliability

Reliable stable pressure dew points up to an ambient temperature of +113°F

Use exhaust heat twice = save twice

Cleverly combines hot water or process water treatment with the compressed air drying process



Efficient compressed air

IE4 drive motors, exceptionally low internal pressure losses

Minimal interfaces

The Sigma Control 2™ manages the compressor, dryer, and heat recovery