

# KAESER report

A Magazine for the Production Industry

Summer 2018

## Making Sparks Fly

High-end composite brake discs for the automotive industry



Compressed air for the EMO:  
KAESER CONTAIN-AIR

Clean Water for Brazil –  
Serving the environment

Trademarked Italian  
Cheese

The Heavenly Sound of  
St. Stephen's Cathedral





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## Digitalization creates jobs

Properly implemented digitalization will always lead to improved efficiency, flexibility and improved competitiveness. Using these modern technologies makes it possible to create innovative products, additional services and new business models, which not only benefit the companies, but more importantly add value for their customers. Representative surveys of industrial companies have shown that highly digitalized businesses significantly strengthen their workforce with competent, highly qualified employees.

These 'Companies 4.0' are particularly attractive for employees because of their highly innovative environment. A study of 17 countries has shown that the increased use of robots not only raised productivity levels, but also the number of hours worked, the competitiveness and economic growth of the involved companies.

Ultimately, all of these factors resulted in increasing employment levels. Even considering the slight downward trend in the need for unskilled labor, considerably more jobs will be created than lost. Priority one for both employees and companies is the required education and training to master the challenges of these new technologies.

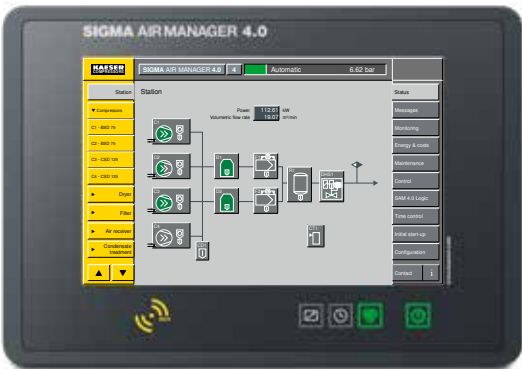


Mr. Frank Mueller, President of Kaeser Compressors, Inc.

The willingness and ability to communicate, business acumen and technological competence will prove indispensable in the future. Sound vocational training, retraining, higher education and continuing professional development are absolute requirements.

The current trend towards upskilling is set to become even more pronounced in the coming years. It is not the fear of unemployment, but the courage and confidence in our capabilities, a commitment to obtaining further qualifications and the determination to implement digitalization that will significantly enhance our competitive edge and contribute to the success of our company.

A dedicated, qualified and productive workforce is – and will continue to be – the most important and irreplaceable key to success.



SAM 4.0: Tomorrow's technology, today

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High-end composite brake discs for the automotive industry

# Making Sparks Fly



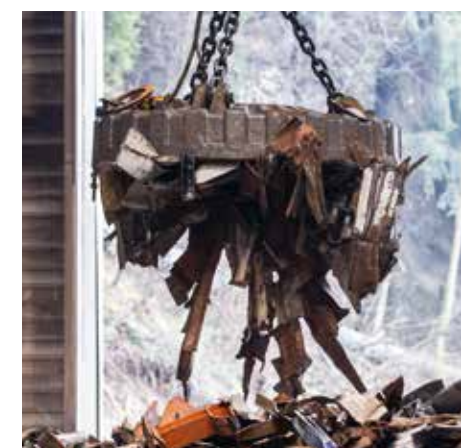
*Raw friction rings roll off the production line*

Schwäbische Hüttenwerke Tuttlingen (SHW) looks back on a long tradition of smelting in the region. The roots of SHW go all the way back to 1365, when the extraction of iron from bean ore began on the Swabian Jura. Although the historical development of the individual manufacturing bases, which were merged to form Schwäbische Hüttenwerke GmbH in 1921, experienced numerous disruptions, it never came to a complete standstill. Schwäbische Hüttenwerke is therefore one of the oldest industrial companies in Germany.

Today, the SHW Group employs over 1,400 staff at various sites around the world and boasts a vast product portfolio of optimized vehicle components for engine and transmission applications. SHW Automotive GmbH started specializing in monobloc ventilated brake discs and composite brake discs in its Tuttlingen and Neuhaus ob Eck plants.

ferent metals, a cast-iron friction ring and an aluminium pot, which are connected by steel pins. The advantage is that the unhindered friction ring can expand radially since it is mounted floating on the stainless steel pins. This significantly reduces thermal

*A huge magnet transports the raw materials to the production area*



The abundant ore deposits in the Swabian Alb, the hydroelectric power generated by the rivers running through the region and the vast forests, which were used to obtain the charcoal required for smelting, made the area ideal for early iron production and processing.

## **A high-tech solution to a common problem**

The problem facing the engineers at SHW Tuttlingen was the frictional heat of up to 1100°F that is generated by the braking process. At these high temperatures, conventional brake discs are subject to slight deformation and may lose their functional efficiency. Composite brake discs solve this problem as they are composed of two dif-

ferent metals, a cast-iron friction ring and an aluminium pot, which are connected by steel pins. The advantage is that the unhindered friction ring can expand radially since it is mounted floating on the stainless steel pins. This significantly reduces thermal deformation and noticeably improves passenger comfort. It also results in enhanced braking performance, even under extreme conditions. The company has been producing its composite brake discs since 1994 and is the market leader in the lightweight composite brake disc sector. Premium car models, such as the Audi Q7 and the Porsche Cayenne, use SHW brake discs.





*Extreme temperatures in the in-house foundry*

### Environment-friendly

One of the many advantages of SHW composite brake discs is the reduced weight of 4 lbs per disc – in other words, it is possible to shave nearly 18 lbs off the weight of each vehicle. The direct correlation between the

total mass of the wheel in motion and the vehicle's CO<sub>2</sub> consumption means that a carbon emissions reduction of 5.67 oz per 100 miles driven is achievable. Meaning, if the total annual distance travelled is 20,000 miles, a typical family car can reduce its

carbon dioxide footprint by a remarkable 1120 ounces per year.



*Pneumatic assistance...*



*...also during the core processing stage*



*Friction rings are loaded by hand in the fully automatic aluminium foundry*

### Blazing hot

The raw brake discs are made of iron, which is cast in the company's own foundry in Tuttlingen. The first thing you notice upon entering the huge hall are the flying sparks everywhere. Your gaze is then instinctively drawn to a river of red-hot, seething iron that flows into an oversized pot. In a setting that is reminiscent of Dante's Inferno, the in-house foundry supplies 20 tons of base melt per hour at temperatures of 2,500 -2,700 °F. Workers in heat-resistant protective gear maneuver the molten metal from one station to the next. The raw materials are melted down in a cupola furnace and then conveyed to the duplexing furnace in transfer ladles, where treatment for hardness and strength takes place. The closed core of quartz sand undergoes a hardening process and is subsequently formed into raw brake disc castings in the moulding shop.

Some of the castings are transported to the nearby facility in Neuhausen ob Eck for further processing, where they are made ready for installation. Depending on the order, other raw discs are supplied directly to the various automotive manufacturers.

### No compressed air, no production

Virtually every step of the brake disc manufacturing process – whether it be measurement, blowing out, alloying, or pneumatically controlled motors – requires a dependable supply of control air. It is vitally important that all components work together seamlessly. The old compressed air system was showing its age after years of operation and was incurring ever-higher costs due to repairs, spare part costs and increased production downtime. "Thanks to the new compressed air system, downtime is a thing of the past. All of the stations that comprise our iron foundry are interdependent, so if one breaks down, the entire system grinds to a halt", Gennadij Hamburg explains. SHW now relies on space-saving container systems from KAESER KOMPRESSOREN for its compressed air supply consisting of oil-injected, air-cooled DSDX series (200 hp) and CSDX series (120 hp) rotary screw compressors. The SIGMA AIR MANAGER 4.0 master controller makes it possible to accurately predict imminent malfunctions that may occur in the system, meaning they can be detected and averted ahead of



*The SIGMA AIR MANAGER 4.0 manages the compressed air supply*



*Space-saving KAESER container system*

time. "KAESER is aware of potential issues with the system long before we have any inkling", Gennadij Hamburg quips. Additional cost savings have been made possible by the heat recovery system, which is used to heat both the production and communal


## Compressed air is required for virtually every step of the brake disc manufacturing process

areas, and to provide the hot water supply. The Swabian brake disc specialist is more than satisfied with the new compressed air system and is already planning to install a third KAESER compressed air container system.



# Compressed Air for the EMO

In autumn 2017, over 130,000 visitors flocked to Hannover from every corner of the globe for the EMO, the world's premier trade show for the metalworking sector. The compressed air needed for the exhibitors' various applications was provided by KAESER KOMPRESSOREN.

 With a spotlight on Industry 4.0, the Exposition Mondiale de la Machine Outil (World Exposition of Machine Tools), or EMO for short, opened its doors once again in Hannover from the 18th – 23rd of September, with the show's slogan "Connecting systems for intelligent production". The world's leading trade show for metalworking takes place every two years at alternating venues (Hannover/Hannover/Milan). This year, it was Hannover's turn to host the event. The largest exhibition grounds in the world raised the curtain on the international metalworking stage, where more than 2,200 exhibitors from 44 participating countries presented the entire spectrum of metalworking technology.

Yet how were the exhibitors' countless tools, machines and systems, all powered by compressed air, brought to life before the eyes of the world? The answer lies with KAESER CONTAIN-AIR systems. Imagine a complete compressed air system,

consisting of a rotary screw compressor, a power-saving refrigerated dryer, air treatment and control, all housed in a shipping container.

Its standard container dimensions mean the compact compressed air system can be deployed at short notice as a temporary source of oil-free compressed air. The easy-to-operate Quick Connect connector panel for pipes and cables enables trouble-free setup at almost any location. The clever silencing system reduces operational sound levels such that the compressor is barely audible and therefore, ideal for the exhibition center. Moreover, equipped with insulation and a heating system, Kaeser CONTAIN-AIR systems operate reliably in virtually any environment, no matter what

the temperature or weather conditions. These features make them the perfect solution for supplying compressed air to the 27 exhibition halls throughout the show. The organizer, Deutsche Messe AG, leased eight compressed air containers for two weeks. Installed outdoors, they fed into the exhibition ground's extensive compressed air distribution network. The containers were delivered and connected over several days. Four of the eight containers were equipped with a DSD 240 series 175 psi rotary screw compressor (706 cfm capacity)

and four with an ESD 352 series 175 psi rotary screw compressor (1060 cfm capacity). The downstream TH 451 and TF 340 refrigerated dryers dried the compressed air to a Class 4 pressure dew point in accordance with ISO 8573-1. The F 250 KE and F 350 KE filters achieved a residual aerosol content of less than 0.01 mg/m³.

The distribution network is laid as a ring main throughout the entire site, through halls 2 to 27. The compressed air line is

made of steel pipe in dimensions between DN 80 and DN 200. Branching off from the main line, the booths are supplied by galvanized piping, which is installed throughout the exhibition grounds. During the fair, compressed air from 135-145 psi was delivered to the exhibitors' consumption points via this ring main.

Once the show had closed its doors, the eight Kaeser CONTAIN-AIR systems were simply disconnected and are now ready for immediate duty elsewhere.

'Process' magazine named KAESER CONTAIN-AIR product of the year 2017 in the compressed air and vacuum technology category





# The Heavenly Sound of St. Stephen's Cathedral

Expert knowledge and traditional craftsmanship have gone hand in hand with the prevailing innovative technology in organ construction for as long as anyone can remember. Germany boasts a long tradition of organ construction and music. In December 2017, the UNESCO Commission paid tribute to this tradition by designating the craft of organ construction and the exceptional music produced by the 'King of Instruments' an Intangible Cultural Heritage of Humanity.

### 'The Opening of the Holy Spirit'

Every year, hundreds of thousands of visitors to Passau's St. Stephen's Cathedral are fascinated by the organ and the daily organ concerts that take place from May to October. The gigantic instrument consists of five separate parts, which can be played at the same time from one console: the great organ, the epistle and gospel organ, the choir organ and the echo organ, concealed from view in the attic behind the middle nave vault section. The 'heavenly' tones descend into the interior through the ornamental grill of the Heiliggeistloch (The Opening of the Holy Spirit).

### Superlative in every way

St. Stephen's in Passau is famous for its cathedral organ, one of the largest in the world. The great organ alone weighs 38 tons. The console offers the organist access to five manuals and 17,974 pipes, arranged in 333 ranks. They are divided into 233 stops, according to their timbre and shape. They include flutes, trumpets, strings and principals, the organ's main voices, which are visible from outside. Combining the stops produces millions of different tones.

The internals of the pipes are made of wood and metal, thereby determining the tone of each pipe. The ratio of length to diameter

and the design are also crucial: deeper tones require longer pipes, while shorter ones produce higher tones. The largest pipe is more than 36 feet long and weighs over 675 lbs. Its deepest tone is almost inaudible with 16 oscillations per second. The tones of the smallest pipes, measuring less than 1/4 inch, are almost above the audible range of the human ear, with a frequency of 16,000 Hz.

### Where the wind blows

Air is what makes the organ pipes emit their individual sound. The air flow hits the lip and is distributed. This creates turbulence that presses outwards and inwards in turn,

### Director of Music, Unterguggenberger, demonstrates the many timbres of the cathedral organ

causing the air column in the pipe to oscillate. The longer the pipe, the deeper the tone.

Yet where does the air come from that makes the pipes resound? Every pipe needs what is known as organ wind in order to function. This refers to a pressurised stream of air, flowing as steadily as possi-

ble. In the past, this was produced by large bellows, which were worked by foot pedals. Nowadays, organ wind is supplied by blower units, which draw in air and transport it via a system of bellows through the wind trunks to the windchests on which the pipes sit. Here the air is ready for use. The great organ alone is serviced by two blowers, which together provide over 2800 cfm. Each organ work has at least one blower. All blower units must be activated in order

### Turning air into sound

the organist can control all five organs at once: the tones are selected by pressing the keys and the ranks of the organ via the stops. The transmission elements between the operating elements of the console and the valves of the windchests are known as tracker actions. The stop-action mechanism of the great organ in Passau Cathedral controls the sliders by means of air pressure pulses. A KAESER AIR-BOX 700, manufactured in 1991 with 5 hp

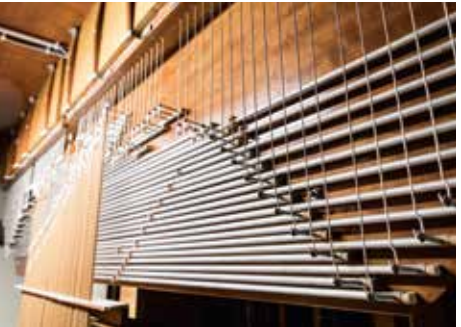
capacity, supplies the compressed air required. When the organist presses the stop switch, it pulls, or opens, the corresponding sliders. The sound mechanism opens the valve, the air flows into the pipes and the mystical sounds that captivate and enthrall visitors then resonate sublimely through the baroque interior of Passau's St. Stephen's Cathedral.



The inner workings



The great organ with its baroque case



A KAESER AIRBOX is responsible for controlling the stops in the great organ

“To my eyes and ears, the organ will ever be the King of Instruments” (Wolfgang Amadeus Mozart 1777)



Excellence in organ building and craftsmanship

# A Lifetime of Music



St. Stephen's Cathedral in Passau, the city of three rivers, boasts the world's largest cathedral organ. It owes its present form and powerful sound to a craft workshop, whose expertise has won international renown.

The organ builder Eisenbarth has been responsible for servicing the cathedral organ in Passau since 1945. The grandfather of the present company director founded the organ workshop in Passau shortly after World War II. Despite its modest beginnings during the post-war years, Eisenbarth has emerged as one of today's leading organ construction companies. Currently employing 22 staff, the family business is one Bavaria's leading organ workshops with a reputation extending well beyond the state borders. Founded in 2004, the private limited company is managed by Agathe Eisenbarth, the granddaughter of the founder, and her father Wolfgang.

## A long tradition of organ building

Every year, the company carries out the necessary service and maintenance work, sometimes even major refurbishments. The monumental renovation project, a complete overhaul that helped give the cathedral organ its present-day appearance and tone, took over four years from 1977 to 1981. During this time, the organ was virtually rebuilt, with the exception of the baroque cases of the great, gospel and epistle organs, which were re-used. No less than 75 miles of cable had to be laid so that all five organ works could be played from one console – a project of truly gigantic proportions.

## The initial spark

In fact, organ construction is invariably an enormous undertaking, even if it appears insignificant at first. It begins with initial hand-drawn sketches and the project is then modelled using CAD software. Photomontages are compiled that show the finished organ project in position to help inspire the creative vision. Discussions then take place between the organ builder, the organist and various other specialists. Several different craftsmen have to work together to complete the overall project. The company's team of organ building experts includes carpenters for the woodworks, metal foundry workers to cast the tin plates



*Mounting the ranks*

for the metal pipes and technicians for the mechanical components and the console. Woodworking is essential in organ building, particularly for the organ case, the body of the instrument. The type of wood used determines the quality of the organ. The wood used to build the windchest, the heart of the organ, and the wooden pipes is also crucial.

## From the flat panel to the round pipe

For hundreds of years, the metal pipes have traditionally been made of a lead-tin alloy. Since 2001, Eisenbarth has had its own pipe workshop, producing organ pipes with three different levels of tin alloy. The basic principle is the higher the lead content, the softer the tone of the finished organ. The process starts with cutting the metal: to this end, the foot sections and bodies of the future pipes are marked on the metal plate



*Craftsmanship plays a vital role, from the metal work...*



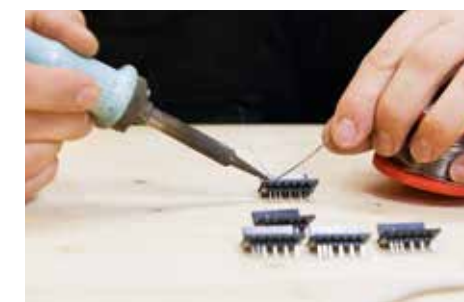
*The pipes are voiced in the intonation room*

according to the table of scales, then cut out and moulded into the finished pipes.

## The pipes learn to sing

The next step is intonation, which means composing the sound of the organ pipes. The organ tuner sets up the rank of new pipes in the intonation room, which contains a rank of tuned pipes. To a certain extent, these serve as a tuning device. As a last step, the individual parts are provisionally assembled in the workshop's organ room to test their functionality. For the grand finale, the instrument is dismantled in the workshop's organ room, loaded onto several trucks and re-erected as a large, unified whole at its final destination. Lastly, the organ is voiced once again in the architectural acoustic environment, which gives the instrument its final tone color. It is a truly majestic sound, enthralling the thousands

of visitors to Passau Cathedral for the mid-day organ concerts, which take place on a daily basis in the summer and twice a week in winter.



*...to the electrical system*



# Clean Water for Brazil

Although 70% of the earth's surface is covered by water, a mere 1% is fresh water and available for human consumption. Clean water for all is one of the biggest challenges facing society, both now and in the future. It is all the more important that companies make it their mission to safeguard this vital resource.

## Innovative water treatment

The growing world population, a changing climate and a higher standard of living are putting an added strain on dwindling resources. From its base in the Netherlands, PAQUES is committed to using its products to ensure that water – vital to sustaining all life on Earth – is kept clean and healthy. Now a global enterprise, the company's roots go back to the 1960s, when the founder, Johan Pâques, supplied silos and similar products to farmers in Frisia (Netherlands). By the mid-1970s, the business had already established an excellent track record. However, there was a major change of direction in 1978 when it sold the first manure fermentation station. From then on, the focus was not simply on storing agricultural goods

but on the treatment of waste products and their further use as raw materials.

## Useful bacteria

In 1980, in cooperation with the Delft University of Technology and the University of Nijmegen, PAQUES started developing an anaerobic process for organic water treatment. The outcome of this collaboration is known as the ANAMMOX® process, the cost-effective and innovative microbiological treatment of industrial effluents. Shortly afterwards, the concept was put into practice in industrial projects. Since the first full-scale plant started up in 2002, many other ANAMMOX® plants have been implemented worldwide, including the one that was sent to 'GELITA do' Brazil last year.

## Sustainable on every level

Headquartered in Eberbach, Germany, GELITA AG is the world's leading supplier of gelatine, collagen proteins for the food industry, food supplements and pharmaceutical products. Approximately 500 of the 2,500 people employed worldwide by the GELITA Group are based in Baden-Württemberg, Germany. However, as a true global player, the group is also represented in over 18 production sites and sales offices in every corner of the world. The company has also maintained a presence in Brazil for more than 20 years – a PAQUES ANAMMOX® plant was installed in Sao Paolo in the past year.

## Putting the gummy in the bears

Gelatine, collagen and collagen peptides are pure, natural products. Particularly in light of this, sustainability is much more than just a trend for GELITA. Ultimately, it is the key to the company's success. Needless to say, this also applies to the consid-

erable amount of water that is required by their production processes. To ensure this water, which is channelled from the nearby Pirapó River, is clean enough to be returned to the river after use, the existing water treatment plant had to be optimized using state-of-the-art technology. This is where PAQUES' ANAMMOX® plant comes into play. Thanks to its cleaning capacity of 87,000 gallons of industrial effluent per hour, GELITA opted to use KAESER's FBS 660M STC series of rotary screw blowers with 150 hp motors for the planned optimization of the existing treatment plant. Combining quiet operation with high efficiency, their strength lies in their low power consumption, an essential feature in times of increasing energy scarcity.



The ANAMMOX® process is the cost-effective and innovative microbiological treatment of industrial effluent. The ANAMMOX® conversion is an elegant shortcut in the natural nitrogen cycle. Anammox bacteria convert ammonium ( $\text{NH}_4^+$ ) and nitrite ( $\text{NO}_2^-$ ) into nitrogen gas.

The ANAMMOX® process can be used for the removal of ammonium from nitrogen-rich effluents, which for example can be found in:

- Municipal wastewater treatment (sludge rejection water)
- Organic solid waste treatment (landfills, composting, digestion)
- Food industries
- Manure processing
- Fertilizer manufacturing
- Petrochemical
- Metallurgy
- Semiconductor manufacturing



# Drinking Water from the Hessian Ried Region

Water is not simply a commodity like any other but a heritage that must be protected. Sustainability is therefore also the watchword for water management. This guiding principle applies both to the drinking water supply and wastewater treatment. In each case, operators require compressed air in a range of pressure levels and different degrees of purity.

## Ried water for Frankfurt and environs

Headquartered in Einhausen-Jägersburg, the Wasserbeschaffungsverband Ried-gruppe Ost association of water suppliers is a service provider in the Hessian Ried region of Germany for the local and regional water supply. Founded in 1968, the plant supplies drinking water to its member municipalities, households and companies in the catchment area. It is essential to keep the water reliably clean and ensure viability for the future. The association states "Our key objectives are to provide the community with a sustainable supply of high quality drinking water and to treat the environment with respect".

## From wells into household taps

The main supply of drinking water comes from 19 deep wells in the region and is fed to the waterworks via pumps. First of all, the raw water has to be purified. This task is

redirecting it to the water network. Since the raw water does not contain any free oxygen, it is initially enriched with oxygen via eight aeration cascades with a flow rate of over 246,000 gallons per minute. Oxygen dissolves the iron and manganese compounds in the untreated water. The metals came from the layers of soil through which the water has previously passed. They undergo a chemical reaction with the added oxygen, known as flocculation, clumping together into flakes that settle. In this state, they are easily

filtered out by the filtering system. Jägersburg waterworks uses three KAESER EB 420 C rotary lobe blowers to backwash the eight filters, with a total filter surface of 500 square yards. After passing through the filtering system, the drinking water is finally conveyed to the consumer by five centrifugal pumps with an average capacity of

performed in Einhausen-Jägersburg, with a capacity of over 660,000 gallons per hour. The water is then stored temporarily in two 660,000 gallon tanks and two 1,000,000 gallon tanks.

However, a great deal more happens between pumping the untreated water and

## KAESER blowers and compressors in water management



*In the Jägersburg waterworks of the Wasserbeschaffungsverband Riedgruppe Ost, KAESER rotary blowers are coordinated and regulated by the central control system, ensuring the safe, efficient backwashing of the sand filters*



*As seen here in the Hessian Jägersburg waterworks, cleanliness...*



*...and advanced technology are prerequisites for hygienic drinking water*

8800 gallons per hour. Two KAESER AIR-TOWER systems supply the compressed air required to operate the pneumatic gates and valves.

## In demand

The Wasserbeschaffungsverband Ried-gruppe Ost was so satisfied with the performance of the KAESER rotary lobe blowers and the KAESER AIRTOWER systems at the Einhausen-Jägersburg waterworks, it purchased additional KAESER compressors a few years later for the plant in Feuersteinberg. Since 2008, two SXC compact compressed air systems (a rotary screw compressor mounted on a refrigerated dryer, an air receiver and an electronic, level-controlled condensate drain) have reliably managed the closed filter system flushing process and the oxidiser ventilation, along with a KCT reciprocating com-

pressor for the air chamber. As the water supply must be reliably sustained without interruption, the decision was also made to sign a maintenance agreement so that potential issues are detected and addressed well before they cause system downtime. It is not just the KAESER blower units and compressors that benefit from this service agreement, but also several older blowers from another manufacturer, which are still in use.

On the company's 60th anniversary in December 2017, our curiosity got the better of us and we contacted the customer to find out whether they were satisfied with KAESER's overall concept. Mr Hechler is delighted with the quiet operation of the blowers and compressors. And because the compressed air supply has been reliable from day one, their expectations in terms of

safety, availability and value retention have been well and truly exceeded.



Gourmet service: the benefits of compressed air

# Trademarked Italian Cheese

Parmesan cheese, or Parmigiano Reggiano, is produced in the northern Italian Province of Reggio Emilia in a time-honored tradition stretching back 900 years. Its roots go back to the Middle Ages and it has even been featured in the literary works of Boccaccio and Casanova.

A hard cheese, made from cow's milk using a clearly defined production method, it is regarded as the king of all Italian cheeses. According to an EU regulation, its production has been protected by the Denominazione di Origine Protetta (DOP) seal since 1996. DOP functions to protect "designation of origin."

The production of Parmigiano Reggiano has barely changed over nine centuries. It still uses the same ingredients, the same process and the same meticulous crafts-

manship. True to tradition, the family-owned business Parmareggio was established in Montecavallo di Quattro Castella, in the Province of Reggio Emilia, in 1983. Just a few years later, it had become one of the world's leading companies for the producing and marketing typical cheese products in the region.

Among cheese connoisseurs, the northern Italian producer is probably best known for its Parmigiano Reggiano, both as wedges and grated, and its Parmareggio butter. Incidentally, Parmareggio is the Italian market leader in this segment.

### A tradition of excellence

The production process begins with cleaning the mould, which is brushed and washed, before being passed to the next processing stage. The typical triangular shape is created by a machine that breaks the shape of the cheese in a controlled way, thereby revealing the cheese's classic granular texture. The resulting segments, each weighing between 28 and 35 ounces, are then vacuum packed, where they are wrapped and packaged in a completely automated process. Alternately, the cheese is grated by an enormous, revolving toothed roller, which is propelled under constant pressure towards the mesh by a pneumatic piston. The grated cheese drops into a filter, where the flakes are standard-

ized according to size: the larger flakes are sent back to undergo a further processing step. They are subsequently sucked into a multiple-head scale, where a vibrating platform distributes them to a number of trays for product dosing. The final step is the packaging machine, which collects a pre-defined amount in a bag, before closing and sealing it.

### Compressed air is the driving force

Although the compressed air does not come into contact with the product at any time, it still drives all machinery from processing to transport, right through to quality control, while meeting the strictest requirements for food production applications with quality class 1.4.1 as per DIN ISO 8573-1. The compressed air system that powers both plants in Modena fits into a single compressor room and houses two KAESER CSD series fluid-injected rotary screw compressors, 60 and 100 hp respectively. One operates as an on-off machine with maximum efficiency at maximum capacity, while the other (SFC) handles peak demand, as the peak load machine. This combination produces just the right volume of compressed air with minimum energy consumption.

### Saving energy

Every element of the system must be taken into consideration to make power consumption as cost-effective as possible – the same also applies to the drying system. In this instance, an energy-saving SECOTEC TF® series refrigerated dryer is used. The dried air is pre-filtered using KB series fil-

ters and then passes through KAESER KEA series activated carbon filters.

Heat recovery is also another important factor. In order to recover the thermal energy generated by the compression process, Parmareggio has incorporated a series of KAESER KOMPRESSOREN's PTG heat exchanger systems, which absorb the heat

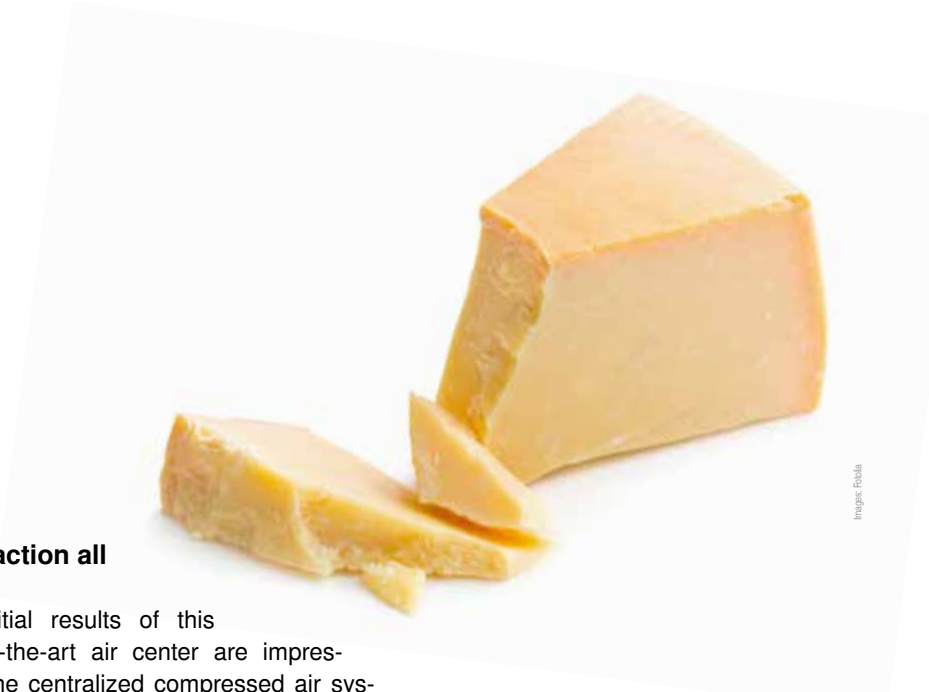
### Satisfaction all round

The initial results of this state-of-the-art air center are impressive. The centralized compressed air system's power consumption for both plants is currently lower than that previously required by the cheese production plant alone. Overall, we anticipate a total energy

Still not breaking the mold: nine centuries of history – almost a millennium of flavor, tradition, literature and ancient craftsmanship.

from the compressors to heat the hot water required by numerous dairy applications. The SIGMA AIR MANAGER 4.0 master controller orchestrates operation of all connected system components. Its main function is to ensure the two compressors are activated in the correct sequence. It also records the necessary system values in readiness for the next control cycle, and minimizes energy consumption. Not only is the master controller able to maintain the required pressure for the specific application, it also gathers all operating data of the equipment in the compressor room, enables predictive maintenance and guarantees maximum compressed air supply dependability.

saving of approximately 30%. In addition, calculations show that by using heat recovery to heat the service water supply, the company's gas consumption is reduced by approximately 176,000 cubic feet per year.







# A Great Place to Work

Trust, approachability, diligence and respect are the driving forces of this successful KAESER branch, which was founded in 1995. At the same time, these values make KAESER Mexico a ‘Great Place to Work’.



Managing Director Angel de Lope is instrumental in upholding the successful corporate culture



Guests are greeted with a friendly smile in the reception area

The Great Place to Work® Institute is part of a global research and training consultancy that helps organizations around the world develop high-trust workplace cultures. “The key to creating an exemplary workplace culture lies in establishing positive working relationships based on trust, pride and team spirit”. In a nutshell, this is the intriguing finding of the two business journalists, Robert Levering and Milton Moskowitz, co-authors of the 1988 book entitled “The 100 Best Companies to Work for in America”.

### Trust as a corporate goal

Back in 2010, KAESER COMPRESORES Mexico teamed up with the Great Place to Work® Institute for the first evaluation of its working environment to find out how the company rated in terms of workplace culture. “The following year, we knew what changes we had to make in order to achieve the conditions for the coveted certificate”, said David Ferregrino, Commissioner for Quality, the Environment and Occupational Safety. The second evaluation was conducted in 2011, with sensational results.

Not only was KAESER Mexico awarded the certificate from the Great Place To Work Institute, it was also included in the list of the 100 Best Workplaces in the country.

### Strong commitment to values

Developing a good corporate culture is crucial in inspiring the workforce to achieve their best performance. The corporate culture is based on integrity, empathy, the well-being of each individual, the willingness to learn and a proactive approach in order to find the optimal solution for any given situation. With clearly defined corporate values, care is taken to ensure everyone understands the true meaning of these values so they can act accordingly.

### Aesthetic interior design

A positive corporate culture also presupposes a pleasant working environment and appealing interior design. This applies not just to each individual workstation, but also to the areas where employees meet to eat and socialize during their breaks. To this end, a new catering service has been in-

troduced, offering premium quality meals at affordable prices.

### Ongoing development

Throughout our lives, we undergo a continual development process. This is vital for each individual’s personality, but also for the employees in an organization. KAESER Mexico has implemented a program that seeks to cultivate the personal and professional skills of its employees. It funds both language courses and additional vocational qualifications.

### Spreading positivity

Having received the “Great Place To Work” award, the staff of a successful company such as KAESER Mexico, wish to spread the positivity they have experienced here with their town of Querétaro. The employees and management have been involved in a charity program since 2009 making a joint donation to a local orphanage.

## Thorough training and active integration



# Committed to Diversity

Collective learning and mutual respect lead to shared growth. In its training programs, KAESER KOMPRESSOREN is placing its trust in young people from around the world.

The program is promising, but not exactly new – it has been achieving results for the last five years. KAESER KOMPRESSOREN takes pride in the international background of its apprentices. Not just from Coburg and Gera, they also hail from Vietnam, Greece, Spain, Romania, Italy and the US. In 2016, the company went one step further and took an active stand on internal integration by creating 23 additional apprenticeships for young refugees. This created a melting pot with its own set of challenges, but which also offers a multitude of opportunities.

As one of the region’s largest training enterprises, KAESER KOMPRESSOREN has enormous expertise in all aspects of training specialists. KAESER apprentices are among the best-in-class in the Chamber of Industry and Commerce, both in Bavaria and Germany. KAESER devotes this expertise to helping all apprentices obtain their vocational qualifications. The goal of the training program is genuine integration in the company, in the social environment and in the region. Nonetheless, tremendous effort was involved during the preliminary stages, particularly for the young people with a refugee background. “It was no easy task to find suitable candidates,” as Rüdiger Hopf, chief instructor, recalls. The dual system of apprenticeships is unheard of in most of the refugees’ – and also the young Europeans’ – home countries. Another complicating factor is that few refugees have any certificates, making it difficult to assess their skills at first.

To provide an optimal learning environment for all apprentices, the company expanded the training center by approx. 5400 square feet, procured additional machine tools and hired two new instructors. The modern environment, equipped with state-of-the-art production technology machinery, prepares the young people for the world of work.



The company’s commitment has even received official accolade – the “Training Ace” competition selected the eleven best concepts from approximately 200 entries. The winners were announced at the formal award ceremony in the Federal Ministry for

Economic Affairs and Energy in Berlin on the 12th of December 2016. Kaeser Kompressoren achieved first place in the ‘Industry, Trade, Service’ category and won the gold trophy.

The space where employees come together to eat and socialize during their breaks





ASD series SFC rotary screw compressors with synchronous reluctance motor

## Ecological and Innovative

The ASD series of variable-speed compressors will be the first medium-sized compressors to be equipped with innovative synchronous reluctance motors, with considerably lower losses in the crucial partial-load range, compared to asynchronous motors.

### An innovative drive system for a sustainable future

Thanks to proprietary SIGMA PROFILE technology and innovative drive concepts, KAESER's ASD rotary screw compressor series offers flow rates ranging from 111 to 194 cfm, delivers outstanding performance and reliability and combines exceptional energy efficiency with space-saving design. The new variable-speed addition to the ASD series now boasts innovative drive technology, which, although not completely new, has been virtually reinvented for use in rotary screw compressor applications. The major advantage of this complete solution, which was developed in close partnership with Siemens, is that it delivers efficiency gains of up to ten percent in the partial-load range, compared to conventional asynchronous motors.

### Variable-speed drive with high system efficiency

With its variable-speed version (SFC) of the ASD series, even more customers can achieve lower energy consumption and operating costs. This is important because compressed air systems are often constructed on a modular basis. Continuously running compressor systems with IE3 and IE4 motors cover base load demand, while additional peak-load compressors respond flexibly to meet extra demand. The KAESER ASD rotary screw compressor with a synchronous reluctance motor meets the criteria for top IES2 classification, and raise the bar of drive technology efficiency to a completely new level. This translates into significant energy cost savings of over \$500 per year on average (based on approximately 6,000 operating hours at a rate of 10 cents per kilowatt hour).

### The best of both worlds: synchronous and asynchronous motor technology

This new and innovative series of standard motors combines the advantages of both asynchronous and synchronous motors in a single drive system. First, no aluminium, copper or expensive rare earth magnets are used in the rotors. Instead, they are made of electrical steel with a specialized profile and arranged in series, making the drive highly durable and maintenance-friendly – the typical advantages of asynchronous motors. Second, the control properties of the new motors are comparable to those of synchronous motors. The special rotor design enables reluctance motors to deliver high speeds without additional rotor warming due to current flow. This results in significantly lower bearing temperature, which, in turn, has a positive effect on service life and efficiency.



The latest generation SM series rotary screw compressors

## Quiet, Efficient and Dependable

Featuring a further refined, flow-optimized SIGMA PROFILE airend and the advanced internal SIGMA CONTROL 2 compressor controller, the latest generation SM series rotary screw compressors not only deliver in terms of compressed air availability and efficiency, but also excel with higher flow rate and significantly lower power consumption.

Compared to their predecessors, the new SM series rotary screw compressors deliver up to approximately 10% greater flow rate in the 34 to 57 cfm flow range at 116 psi with drive powers from 7 to 12 hp. Two factors account for this impressive performance boost: the new, optimized rotary screw airend with a flow-optimized inlet valve and the minimization of internal pressure losses. These improvements represent a reduced specific energy requirement of up to 13%. The use of high-performance Super Premium Efficiency IE 4 motors (10 and 12 hp versions) also helps achieve additional energy savings, since they are currently the most efficient electric motors available. KAESER KOMPRESSOREN is the only compressed air systems provider at present to offer these motors.

### Efficient control to match compressed air consumption

Another key efficiency-enhancing component is the "SIGMA CONTROL 2" internal controller. This advanced system not only enables precise, demand-oriented performance matching and reliable monitoring, it also allows connection to the Sigma Network via its standard Ethernet interface. The large display and the RFID reader integrated in the control panel make onsite communication with the system a breeze and guarantee secure controller log-in. The RFID reader also standardizes service, significantly raises service quality and ensures that only authorised personnel have system access.

A version with an integrated frequency converter (SIGMA FREQUENCY CONTROL) for 10 hp drive power is also available for applications where variable speed control is of benefit.

### Whisper-quiet and maintenance-friendly

The SM compressor series' modular design concept offers further advantages: apart from the standard versions, which have a compact footprint of just 5 sq. ft., the SM 7.5, SM 10 and SM 15 models are available as "T" versions, featuring an integrated, thermally shielded refrigerated dryer. The space-saving, compact design is ideal for work environments where space is a premium. When the unit is closed, the soundproof enclosure panels reduce the already low operational sound levels to a super-quiet background hum.

The externally installed coolers are easy to access, which saves time and money when performing service work. Furthermore, the coolers and motor are cooled with fresh air to ensure low motor temperature, long service life and low compressed-air discharge temperature. The cooling system is equipped with a patented, premium-efficiency, dual-flow fan with separate cooling air flows for the motor and compressor. This not only helps achieve

optimum cooling performance, low compressed air discharge temperatures and minimal sound levels, but also promotes efficient air compression.





# Compressed Air That Means Business



**And we're in the business of saving you time,  
money, and headaches.**

Our *built for a lifetime*™ rotary screw compressors feature premium quality motors, coolers, and airends. Simple maintenance access, fewer wearing parts, and smart controls keep your plant running day in and day out.

When you're ready to get down to business, call KAESER. We've got the savings you've been looking for.

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