

KAESER report

A Magazine for the Production Industry

2/25

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Minimal energy consumption.**

Compressed air on a grand scale
A partnership for success

A sustainable vision for the future
New compressors and heat recovery

A revolution in tunnel construction
Compressed air for next-generation
tunnel boring machines



6-7



12-13



16-17



22-23

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Reliability and redundancy

AI in industry is about far more than just large language models

It seems that everyone is talking about Artificial Intelligence (AI) these days and, in most cases, the conversation centres on the impressive capabilities of LLMs* such as ChatGPT or Gemini. They generate text, answer questions, and are reshaping the way we access and process information. But whoever reduces AI in industry to just these models is missing the bigger picture and the actual revolution that is taking place. The true power of AI lies not in performing isolated tasks, but in its deep, strategic integration across all operational areas of a business.

It is a misperception to view AI purely as a tool for marketing or customer service purposes. Its greatest potential emerges when it is woven directly into the value chain – enhancing production, enabling predictive supply chain management, and automating quality assurance processes.

*Large Language Models



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



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

In manufacturing, AI-enabled sensors can detect early signs of wear and tear, allowing maintenance to be scheduled before costly breakdowns occur. In logistics, intelligent algorithms can optimise routing to save both time and fuel. Integration of AI into core business processes unlocks levels of efficiency that traditional methods can seldom achieve. It delivers accurate forecasts, automates repetitive tasks, and allows employees to focus on more complex and creative activities.

It is time to move beyond viewing AI as a superficial addition to existing workflows. Instead, we must recognise it for what it truly is – and what it has the potential to become: a foundational technology capable of reshaping the entire industrial landscape. The future of industry is intelligent, and that intelligence won't come from sporadic deployment of AI as a tool, but from its deep and strategic integration, fundamentally redefining how we work at every level.

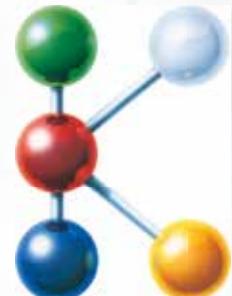
KAESER autumn trade fairs

K Fair: 8th – 15th of October 2025, in Düsseldorf

Compressed air: Essential for the plastics and rubber industry

As the world's premier exhibition for the plastics and rubber sector, the K Fair provides the perfect opportunity for you to engage with experts and leading representatives of the plastics and rubber industry. You can meet professionals from around the world, learn about the latest innovations, and forge new contacts.

Compressed air systems provider KAESER KOMPRESSOREN ensures safe and efficient compressed air supply. At the K Fair, you'll discover a tailored range of products and services for a wide variety of plastics and rubber industry applications. Why is compressed air so vital to plastics manufacturing? Here are just a few examples:



2025

8-15 OCTOBER
Düsseldorf, Germany

KAESER
KOMPRESSOREN

You'll find us here

Hall: 11 | Stand: 11H6



Thermoforming:

This method involves pressing a heated plastic sheet into or onto a mould using compressed air.

Machine and tool operation (pneumatics):

From robots and grippers to valves, feed systems and injection moulding machines, compressed air powers a vast array of automated equipment.

Granulate conveying:

Plastic granulates – the raw material for many processes – are often conveyed pneumatically using pipelines, with compressed air propelling them efficiently through the system.

Cleaning and blow-off:

Moulds, tools and finished parts are cleaned using targeted blasts of compressed air to remove dust, shavings, and other contaminants.

Cooling:

In certain processes, compressed air is applied to cool tools or products, thereby reducing production cycle times.

Drying:

Compressed air is sometimes used to dry plastic granulates prior to processing, eliminating moisture that could compromise final product quality.

Packaging and logistics:

Pneumatic systems are also used to support downstream processes such as packaging and internal material handling.

There's so much to explore – and we'd be delighted to show you how our latest technologies can enhance your business. We warmly welcome you to visit the KAESER exhibition stand in Düsseldorf.

AGRITECHNICA: 9th – 15th of November 2025, in Hanover

Compressed air in agriculture

Under the banner "Touch Smart Efficiency", AGRITECHNICA 2025 invites visitors to experience at first hand how smart, connected agricultural systems are harnessing digital technology to boost efficiency, sustainability, and productivity.

Compressed air systems provider KAESER KOMPRESSOREN will be showcasing a tailored product range, and providing information for customers and prospective clients on the many ways compressed air can be used in agriculture – covering the full scope of on-farm and in-field operations. Here's a small selection:



- ✓ Conveying grain, seed or fertiliser (silo-filling)
- ✓ Spraying technology (crop protection technology)
- ✓ Cleaning machinery and buildings (blowing out machines, tools and workshops)
- ✓ Powering tools and devices (compressed air tools)
- ✓ Tyre inflation

**AGRI
TECHNICA**
THE WORLD'S NO. 1



KAESER
KOMPRESSOREN

You'll find us here

Hall: 2 | Stand: A55



Compressed air station modernisation delivers five-figure energy savings

A party favourite for more than 50 years

What's the one thing every party needs? That's right – a five-litre self-serve party keg! This iconic mini keg is filled with beer from renowned German and international breweries, and its tinplate packaging is made by ENVASES from Öhringen.

Image: AdobeStock

It all started back in 1871, when master plumber Karl Huber founded the company Huber in Öhringen, Baden-Württemberg – the business from which ENVASES would eventually emerge. At the time, Karl Huber had no thoughts of making beer kegs for breweries. The company produced metal containers, beginning with simple buckets sealed with wooden lids. Nearly a century later, in 1972, Huber invented the first small beer keg made of tinplate: the now-famous five-litre self-serve party keg.

It was an instant hit. Today, ENVASES Öhringen is the world's leading manufacturer of tinplate party kegs, a key partner to breweries

across Europe and the global market leader in the five-litre segment. Like so many industries, ENVASES relies on compressed air for a wide range of manufacturing processes. It powers numerous tools and machines, including eccentric presses and forming machines that punch base and top ends (lids) from coated tinplate sheets. Other machines then round-weld, shape and seam the printed sheets to form the keg body, and attach the top and bottom ends. Compressed air is also essential for transporting and handling materials, including suction applications using the Venturi principle.

An investment that pays off

At ENVASES Plant 2, compressed air is absolutely essential. It must not only be reliable, but also available in sufficient quantity and quality (compressed air quality class ISO 8573-1:2010: 1-4-1). With future plans to expand and modernise the production facilities to accommodate new products, Jan Massa, Maintenance Manager at ENVASES Öhringen, had long been con-

cerned about how to modernise and expand the compressed air station. The issue became more urgent when an older compressor from another manufacturer failed and needed replacing. ENVASES had already had excellent experiences with KAESER systems at both Plant 1 and 2. Over the years, the company had developed into a close, trusted partnership. So when the time came to optimise the compressed air supply, Jan Massa once again turned to his KAESER contact. The goal was to supplement the existing KAESER compressors with new systems to ensure the station would meet future demands with maximum efficiency. KAESER conducted a range of simulations using various equipment configurations to

identify the most effective setup. It quickly became clear which systems would best complement the existing ones to meet current compressed air needs, both reliably and with maximum energy efficiency. Here's the result: The two existing KAESER BSD 72 rotary screw compressors now work alongside a new CSD 130 rotary screw compressor to cover the base load. A new frequency-con-



The new expanded compressed air station is designed to meet higher future demand.



The iconic party keg remains a favourite among consumers worldwide.



ENVASES supplies its products to leading German and international breweries.

with the outcome: "Thanks to the huge cost savings, the investment has more than paid for itself."

By modernising our compressed air station and using heat recovery, we've achieved substantial energy savings.

Jan Massa, Maintenance Manager at ENVASES Öhringen

this had developed into a close, trusted partnership. So when the time came to optimise the compressed air supply, Jan Massa once again turned to his KAESER contact. The goal was to supplement the existing KAESER compressors with new systems to ensure the station would meet future demands with maximum efficiency. KAESER conducted a range of simulations using various equipment configurations to

controller. This smart master control system ensures optimal coordination across all equipment – enabling unprecedented energy savings. As the central control hub for the compressed air supply, it monitors and manages all components with maximum cost efficiency in mind. The results of the modernisation are impressive. The energy consumption of the optimised compressed air station is now

Seven generations, 248 years of history, and still family-run: the BUTTING Group based in Knesebeck has grown to become one of the world's leading processors of stainless steel. Its product portfolio includes welded stainless steel pipes, clad pipes, vessels and systems, cryogenic systems, and much more. The family-owned company continues to evolve – and with it, its need for compressed air.

Since its founding in 1777, BUTTING has experienced continuous growth. What began as a small German craft business has evolved into a globally active group. Today, the company's headquarters in eastern Lower Saxony spans an impressive 535,000 m².

In Knesebeck and six other production sites worldwide, countless products are manufactured from stainless and clad materials for a wide variety of applications: clad pipes for onshore and offshore oil and gas projects, welded stainless steel pipes for the semiconductor industry, vessels and entire systems for pulp and paper production, vacuum-insulated transfer systems for the transport of liquefied gas and liquid hydrogen, and polished stainless steel tubes for the construction industry – including façade pipes used on the Burj Khalifa. In short: wherever there are demanding requirements for materials and quality, BUTTING products are in use. At the Knesebeck site alone, 80,000 tonnes of stainless and clad materials are processed each year. With experience, innovation and continuous development, the site, product range – and compressed air requirement – have all grown steadily.

Compressed air on a grand scale

The demand is now enormous. The largest consumers are the blasting systems used to clean steel and stainless steel pipes and remove oxide layers, for example. Each of the blasting lances used requires between 20 and 40 m³/min of compressed air. But pneumatic controls for many of the production machines and systems also



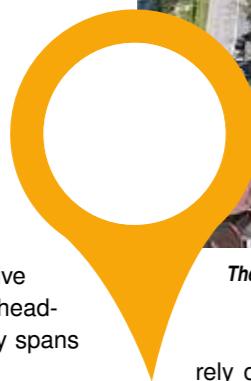
BUTTING and KAESER: A partnership for success

Compressed air demand on a grand scale

KAESER's overall system concept was spot on.

Stefan Lahmann, Utilities & Energy, BUTTING Knesebeck

Image: H. Butting GmbH & Co. KG



The BUTTING site in Knesebeck extends over 2 km in length.

rely on compressed air. In total, around 120 m³/min are needed – making compressed air indispensable. Since the 1980s, BUTTING has placed its trust in one reliable partner: KAESER KOMPRESSOREN.

In 2018, Carsten Bagge (Head of Facilities & Utilities) and Stefan Lahmann (Utilities & Energy) at BUTTING Knesebeck faced a major challenge. A large fire had completely destroyed one of the production halls, including the central compressed air station.

A new compressed air supply system had to be designed and implemented in a very short time. The decades-long collaboration with KAESER KOMPRESSOREN proved invaluable. Working together, a completely new, decentralised compressed air strategy was developed for the entire Knesebeck site. "On the basis of our long-standing partnership, we jointly developed a tailored overall concept," says Carsten Bagge.

The main priority was to ensure a reliable compressed air supply with built-in redundancy, not only to secure current production, but also to support future expansion. And the concept delivered: the new system architecture allows the compressed air stations to scale with demand. The current setup provides a maximum flow rate of 182 m³/min (at pressures between 6.6 and 7.5 bar), supplied by eight rotary screw compressors – one frequency-controlled and seven with fixed-speed drives. This configuration guarantees a dependable compressed air

The compressed air demand is covered by eight rotary screw compressors – one frequency-controlled and seven fixed-speed units.



supply, with ample reserve capacity. A further cornerstone of the strategy was the decentralised layout: three stations were installed close to the site's largest consumers. The short distances to major users, combined with distribution via an extensive compressed air network, ensure that both pressure and flow remain consistent throughout the entire facility.

Energy efficiency and cost-effectiveness were also key factors in meeting the site's annual compressed air demand of nearly 25 million m³. KAESER rotary screw compressors, equipped with high-efficiency IE4 motors and flow-optimised SIGMA PROFILE rotors, deliver outstanding specific package input power for exceptionally efficient operation. To maximise overall system efficiency, the compressors, dryers and filters are centrally managed by the SIGMA AIR MANAGER 4.0. This advanced master controller ensures seamless coordination between all components, unlocking previously unattainable levels of energy efficiency. The results

speak for themselves: annual energy consumption has been reduced by over 100,000 kWh, cutting CO₂ emissions by 80 tonnes per year. In total, the new compressed air system enables BUTTING to save nearly €27,000 annually.

Carsten Bagge and Stefan Lahmann are thoroughly impressed by the cost savings, enhanced supply reliability, and the many additional advantages delivered by the new compressed air strategy.



Two employees welding components to a beverage filling ring.

Image: H. Butting GmbH & Co. KG

45 percent lower energy costs

Optimised efficiency for maximised savings

The Geberit name is known throughout the world. What began as a modest Swiss family business has since evolved into Europe's leading provider of sanitary products. Time and again, its high-quality, innovative solutions for plumbing and bathroom systems have set new industry standards – both in the past and today.

The Geberit story began in 1874, when Caspar Melchior Albert Geberit opened a plumbing workshop in the old town of Rapperswil, Switzerland. A major breakthrough came in 1905 with the creation of the first wooden cistern, lined and fitted with lead components. This pioneering product, given the promising name "Phoenix", quickly went into serial production and was soon being sold across Switzerland and neighbouring countries. The launch of the first plastic cistern in 1952, followed by the concealed cistern in 1964, paved the way for the company's continued success.

Today, the international Geberit Group is firmly established as Europe's market leader in sanitary technology, and in 2024, the company celebrated its 150th anniversary. With 26 production sites worldwide and a strong distribution network in over 50 countries, Geberit is headquartered in Rapperswil-Jona, Switzerland.

The Langenfeld site near Düsseldorf is one of the world's leading production centres for press-fitting systems made of stainless steel, carbon steel and copper, and has been part of the Geberit Group since 2004. Its manufacturing operations include cutting, bending, forming and joining of metals, through to the assembly of semi-finished and finished goods. Langenfeld is also home to Geberit's second information centre in Germany. Continuous innovation and a strong commitment to sustainability have long been core values at Geberit – and were key drivers behind comprehensive modernisation of the Langenfeld site in 2018.

The initiative included upgrades to the production facilities and manufacturing technology, together with a complete overhaul of the compressed air supply system. The compressed air demand for operating

the metal forming and processing machinery, handling systems and pneumatic controls is considerable. The biggest consumers are the forming presses, which require a clamping force of 50 tonnes generated by compressed air. In total, the site consumes up to 38 m³/min of compressed air at 6.8 to 7 bar.

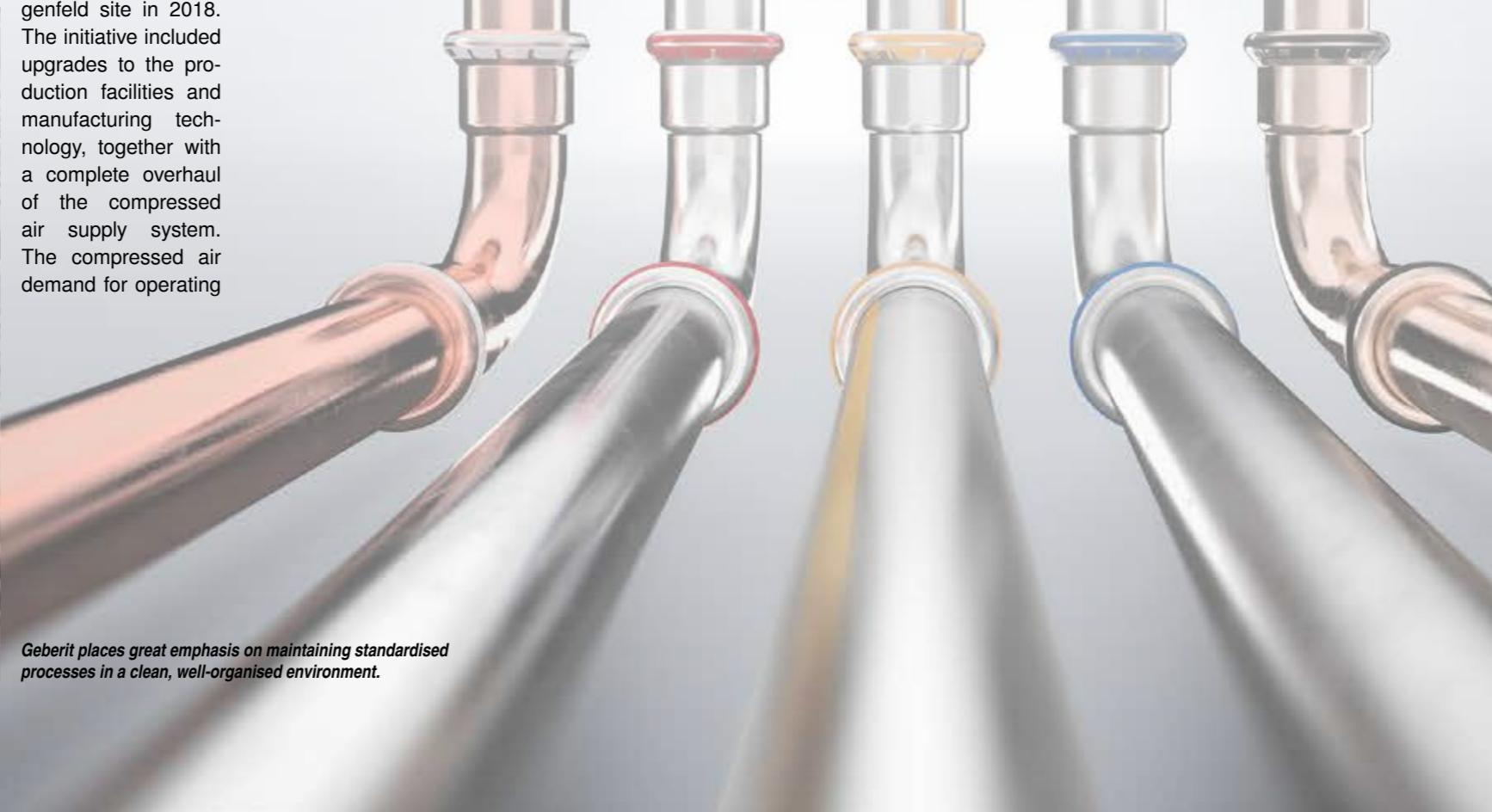
As Oliver Werner, Head of Maintenance, recalls: "Our key objectives were to significantly improve energy efficiency, meet strict air quality standards, and ensure sufficient redundancy." And remarkably, these goals were achieved using far fewer compressors than before.

Seven replaced by two

Until 2018, seven older compressors supplied compressed air through a decentralised system – but their energy performance left much to be desired. Today, just two highly efficient KAESER DSD 205 rotary screw compressors provide the entire supply – one with variable speed control and one fixed-speed unit. Equipped with IE4 super premium efficiency motors, they delivered an immediate and significant boost in energy performance. However, the real secret behind the system's exceptional efficiency is the SIGMA AIR MANAGER 4.0 – an intelligent master controller that ensures optimum coordination of all compressors, dryers and filters. By continuously adjusting air output and energy use to match real-time demand, it achieves previously unattainable levels of efficiency.



Geberit places great emphasis on maintaining standardised processes in a clean, well-organised environment.



A well-designed compressed air treatment system ensures dry compressed air and protects sensitive machinery from unwanted moisture.



From left: Andreas Goldhagen (Geberit), Oliver Werner (Geberit) and Björn Schulz (KAESER).

KAESER delivered with optimised efficiency for maximised savings.

Oliver Werner, Head of Maintenance

The perfect energy-saving duo: New compressors and heat recovery

A sustainable vision for the future

Verweij Houttechniek, a family-run business based in Woerden, The Netherlands, has set an ambitious target: to reduce its CO₂ emissions by 70% within five years and achieve full energy neutrality by 2040. To realise this vision, the company is continuously looking for ways to reduce energy use across its operations. Recent modernisation of the compressed air system proved to be an ideal opportunity – resulting in significantly lower gas and electricity consumption.

With a history spanning more than 135 years, Verweij Houttechniek is now managed by the fifth generation of the founding family. Over 100 employees work at its main site in Woerden and a second facility in Drachten. The company produces windows, doors, frames and other timber components using sustainable materials, with a strong focus on renovation projects. Customers receive expert advice on selecting and designing the right solutions, and all products are built to combine comfort, security, and energy efficiency. At Verweij, sustainability and circular economy principles are central to every stage of the process.

Saving energy with heat recovery

A major energy-saving opportunity arose when it came time to replace the old compressors – which had clocked up over 100,000 operating hours – with modern, energy-efficient alternatives. “We wanted a significantly more efficient compressed air station,” explains Ad Neuteboom, Production Coordinator at Verweij Houttechniek. “That meant using compressors with lower power consumption and recovering the heat they generate. Heat recovery was the keyword. Our biggest demand for heat is in the paint shop and drying room. Previously, a gas boiler generated the warm air needed there, but thanks to the new heat recovery system, we were able to find a much smarter solution. To maximise the benefits, we positioned the new compressed air station as close as possible to the areas with the highest heating demand. A purpose-built three-branch ducting system now distributes the recovered heat to the paint shop, drying room and production hall. Each duct is equipped with self-regulating intelligent valves that automatically close once the target temperature is reached in a given room.”

Housed on a specially constructed platform four metres above ground, the new compressed air station comprises three ASD 60T rotary screw compressors with integrated refrigeration dryers, coalescence filters, and two 900-litre buffer tanks. An additional 2,000-litre buffer tank was installed to maintain stable pressure throughout the plant’s extensive compressed air network. Since nearly all of the site’s machinery relies on compressed air, reliability is essential. The system is therefore designed with full redundancy: the three compressors are managed by a SIGMA AIR MANAGER 4.0 master controller, which balances the workload between the machines evenly. Typically, only two compressors run at any given time, while the third remains on standby.

So, were the energy targets achieved? “Absolutely,” says Ad Neuteboom. “Heat recovery alone has drastically reduced our gas usage. In the heating season before the upgrade, the paint shop consumed over 15,000 cubic metres of gas. This past winter, we barely used any at all – the gas supply was essentially shut off. We’ve consequently reduced our gas costs by around 27% and electricity use has also fallen by about 7%. Although we’re now running three compressors instead of two, the new units are significantly more efficient. Another major win was lowering the system pressure from 10 bar to 8 bar. That single change alone saved us a huge amount of energy – roughly 7% per bar. We’re very pleased with the performance of our new KAESER compressors and the heat recovery system. It’s an important step on our journey toward becoming energy-neutral.”

Ad Neuteboom, Production Coordinator at Verweij Houttechniek (right), with Djuri Nijland, Account Manager at KAESER Compressors Nederland, standing in front of one of the three ASD 60T rotary screw compressors.



The SIGMA AIR MANAGER 4.0 ensures efficient operation and balances the workload between the machines evenly.



Doors, windows and frames are fully glazed and finished on site.



Thanks to the new compressors and heat recovery system, we’ve significantly reduced our energy costs.

Ad Neuteboom, Production Coordinator, Verweij Houttechniek

All images: Verweij Houttechniek

Biopark in Argentina protects endangered animal and plant species

Mission: Species protection

Environmental education and conservation are the two core strategies through which the Temaikèn Biopark in Escobar, near Buenos Aires, works to protect biodiversity. Visitors to the park are both captivated and educated through unique encounters with nature and the exploration of diverse landscapes from Argentina and around the world. The name Temaikèn is derived from the indigenous Tehuelche language, combining "tem" (earth) and "aiken" (life).

Year after year, the natural areas of our planet shrink dramatically, leading to a significant decline in the species that inhabit them. Human activities such as the illegal wildlife trade, indiscriminate hunting, deforestation, urban sprawl and overfishing are among the main drivers of biodiversity loss. Founded in July 2000, Fundación Temaikèn is dedicated to reversing this alarming trend.

Temaikèn focuses on key initiatives such as the recovery of endangered species through the reintegration of native flora and fauna, the creation, preservation and restoration of ecosystems, and the reconnection of people with nature through experiences that inspire responsible environmental stewardship. The park also engages in research and advocates for government action and cross-sector collaboration.

This unique biopark lies just 45 minutes away from Buenos Aires, in Belén de Escobar. Temaikèn covers 34 hectares and is home to both native Argentine wildlife and exotic, endangered species. In addition to the biopark, Temaikèn also manages the Osununú Nature Reserve, which includes conservation programmes for the Paraná pine ecosystem, as well as for butterflies and orchids, as part of the national preservation system.

The park houses over 7,400 animals across 300 species of mammals, birds, reptiles and fish, all in enclosures designed to replicate their natural habitats. Highlights of the Temaikèn Biopark include an aquarium showcasing Argentina's three aquatic ecosystems, a farm with animals and vegetable gardens offering hands-on experiences for visitors, and the largest aviary in South America.

The aquatic world at Temaikèn Park

Temaikèn has created a dedicated aquatic world, faithfully replicating three typical environments associated with water and their characteristic species, and representing the three different Argentine ecosystems: coastal habitat, freshwater rivers and the ocean. With carefully controlled temperatures and water quality assured through constant monitoring, filtration and ozonation, each environment is tailored to the specific needs of its inhabitants.

Compressed air is a versatile energy source

used across all industries, and even wildlife parks such as Temaikèn rely upon it. It powers the valves and drives in the marine and aquarium systems, and is essential for flushing the water park's filtration systems.

A key application is the ozone generators, which disinfect the water in the aquarium and the various lakes. The compressed air, delivered at approximately 8 bar and a flow rate of up to 4 m³/min, is supplied by KAESER rotary screw compressors.

The main room houses two KAESER rotary screw compressors: an ASK 40 and an AS 36, paired with a DC 5.0 heatless-regenerating desiccant dryer. Desiccant dryers are often used in sensitive applications where high compressed air availability is essential. DC desiccant dryers are designed with quality in mind to ensure maximum reliability and minimal maintenance costs throughout their service life.

In the second room (located on the first floor), there is a smaller rotary screw compressor – an SM 12 – featuring an internal SIGMA CONTROL 2 controller, a 350-litre air receiver with electronic condensate drain (ECO-DRAIN 30), and a KYROSEC TBH 14 refrigeration dryer. This dryer provides dependable performance even at high ambient temperatures up to

+50 °C. With minimal pressure loss in the heat exchanger system and a low-maintenance design, operation is

exceptionally efficient, whilst its compact size provides impressive flexibility for a wide range of applications.

The Temaikèn Biopark, located in the city of Belén de Escobar near Buenos Aires, is unique for its mission and its exhibits, and is definitely worth a visit. The biopark is about a 45-minute drive from the Argentine capital, but as it is not served by the public transport network, the most convenient and cost-effective way to visit is by booking an entrance ticket that includes a transfer service.



Image above: The Temaikèn Biopark protects, among other things, endangered animal and plant species.

Image below: Compressed air is an important aid in maintaining the water worlds in the biopark.

The systems have been in operation since the park's opening in 2002 and have always provided exceptional reliability.

Temaikèn Biopark, Escobar





Ventilation hygiene and dry ice cleaning experts



Left: The 'Eisschmitt Truck' transports the MOBILAIR compressor and all necessary dry ice blasting equipment.
Right: On site at KAESER's Coburg facility – ventilation duct cleaning in action.

its pV Control system, we can adjust the pressure between 6 and 14 bar, depending on the cleaning surface and the degree of contamination, all with a single machine. Its maximum flow rate of 25.5 m³/min is a perfect fit for our requirements. My team especially appreciates how easy it is to operate. The rotary switch and touchscreen interface are so user-friendly they can be operated even with bulky work gloves. We transport the KAESER portable compressor, together with all necessary dry ice blasting equipment, using our new 'Eisschmitt Truck'. Because the M 255 can operate up to four dry ice blasting systems simultaneously, we're able to work faster and more efficiently at the customer sites."

No room for stale air

In the town of Rottendorf near Würzburg, Eisschmitt GmbH & Co. KG is making a name for itself as an agile, forward-thinking company. Specialising in the hygienic inspection and cleaning of ventilation systems, as well as industrial cleaning using advanced dry ice blasting technology, Eisschmitt relies on high-performance compressors from KAESER to power its cutting-edge equipment.

During our visit, owner Thomas Schmitt and Project Manager Jerome Thompson welcomed us for a behind-the-scenes look at the company's services – and gave us a first-hand introduction to some of the powerful technologies they use in the field.

Why is it so important to regularly clean ventilation systems in public buildings, facilities and businesses?

Thomas Schmitt: "Ventilation and air conditioning systems often accumulate dirt, germs and mould spores – all of which can significantly impact indoor air quality. In many cases, routine maintenance only involves changing filters and cleaning fans. But to ensure safe operation and prevent

contamination of the air with harmful microbes or mould, the ductwork itself also needs to be cleaned at regular intervals."

How do you clean kilometres of ductwork effectively?

Jerome Thompson: "We offer a range of highly effective cleaning methods and equipment for air ducts. Depending on the system, we use rotating brushes, flexible shafts or air whip systems – always combined with simultaneous vacuum extraction and disinfection. For large installations and particularly heavy contamination, we use our in-house developed JETTY robot – a premium solution we created in partnership with the Faculty of Electrical Engineering at the Technical University of Prague. The

The JETTY robot, created in partnership with the Faculty of Electrical Engineering at the Technical University of Prague, is used for large installations and particularly heavy contamination.



JETTY robot is purpose-built to inspect and clean hard-to-reach areas. Its onboard camera system streams live footage to the operator's control panel, enabling real-time navigation and cleaning. The robot's primary method of cleaning is dry ice blasting."

What exactly is dry ice blasting?

Jerome Thompson: "Dry ice blasting is a proven and effective method for cleaning all kinds of surfaces. It works in a similar way to sandblasting – but instead of abrasive media like sand, it uses frozen carbon dioxide (CO₂), in the form of pellets or microparticles. At our facility, we produce our own dry ice in pellet, nugget and block form to ensure consistent quality and availability."

What role does compressed air play?

Jerome Thompson: "Dry ice cleaning requires a specialised blasting system. This typically consists of a dry ice container and a compressed air source, with the compressed air propelling the dry ice particles through the nozzle at extremely high

speeds. When the pellets hit the surface to be cleaned, three things happen: First, the high impact energy helps loosen the contamination. Then, the extremely cold temperature of the dry ice (-78.5 °C) causes the dirt layer to freeze and become brittle. Finally, the rapid expansion of the CO₂ gas helps lift the loosened particles away from the surface. This combination of kinetic energy, thermal shock and gas expansion makes it possible to remove even the most stubborn of contaminants – such as oil, grease or dust – thoroughly, gently and without leaving any residue behind."

Which KAESER compressors do you use?

Thomas Schmitt: "We've been using a range of KAESER reciprocating compressors for years; however, the newest addition to our fleet is the MOBILAIR M 255 rotary screw compressor – a large, diesel-powered unit equipped with a powerful 210 kW Cummins engine. Thanks to

Because the MOBILAIR M 255 can operate up to four dry ice blasting systems simultaneously, we're able to work faster and more efficiently.

Thomas Schmitt, Owner of Eisschmitt

Compressed air for next-generation tunnel boring machines

A revolution in tunnel construction

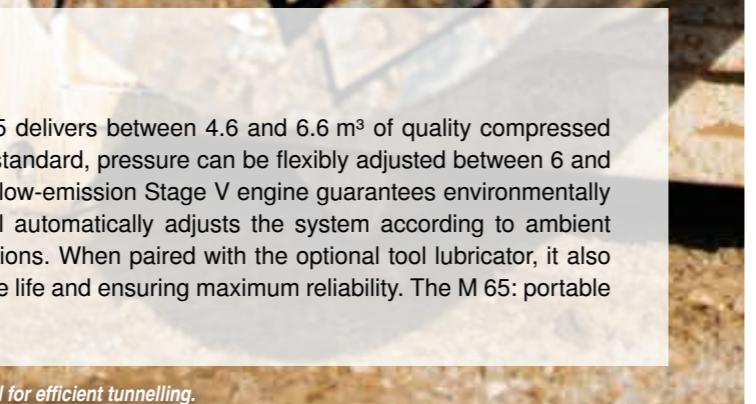
Driven by a desire to redefine the status quo of tunnelling technology, Elon Musk and his company, "The Boring Company", launched a bold new competition in July 2020. The aim? To challenge students from around the globe to design a tunnel boring machine that's faster than anything the world has seen. Leading the charge was a team from the Technical University of Munich (TUM) – and they've topped the podium three times.



M 65:

Compact, powerful and ready for anything: The MOBILAIR M 65 delivers between 4.6 and 6.6 m³ of quality compressed air per minute. Thanks to its innovative pV Control, equipped as standard, pressure can be flexibly adjusted between 6 and 14 bar to meet the needs of the specific application at hand. Its low-emission Stage V engine guarantees environmentally responsible performance, while the intelligent Anti-Frost Control automatically adjusts the system according to ambient temperature, thereby providing optimum protection in cold conditions. When paired with the optional tool lubricator, it also safeguards pneumatic tools from freezing – extending their service life and ensuring maximum reliability. The M 65: portable compressed air, wherever you need it.

The MOBILAIR M 65 injects a stabilising foam into the Texan clay, preparing the soil for efficient tunnelling.



The Boring Company is driven by a bold mission: to revolutionise tunnelling technology by reducing costs and speeding up construction. The aim is to make underground transportation systems – such as the Las Vegas "Loop" and future "Hyperloop" concepts – faster, more efficient, and economically viable.

In pursuit of this vision, the company launched the international "Not-a-Boring Competition", challenging the brightest minds in tunnelling to design and build the world's fastest tunnel boring machine. Among the most consistent contenders is TUM Boring – Innovation in Tunneling e.V., a student organisation of more than 60 members from the Technical University of Munich (TUM). Since the inaugural event in 2020, the team has claimed first place twice – and in March 2025, they returned for a third time with their next-generation machine, setting new standards in speed and technology.

drive system underground, and developed a new pipe-joining system capable of transmitting both compressive and tensile forces – enabling machine operators to respond flexibly to different ground conditions. Yet innovation brings its own challenges, and the sticky clay in the Texan soil proved particularly troublesome. To tackle this, the team developed a sophisticated soil conditioning system using a specially formulated

Our machine had to be incredibly reliable to win this competition – and KAESER was a rock-solid partner.

Felix Blanke, Project Manager

absolute reliability to have any chance of winning the competition. And KAESER's quality is second to none." This gave TUM Boring a clear advantage, and the strategic use of compressed air proved to be a real game-changer.

The big moment in Texas

All the hard work paid off. At the final of the 2025 Not-a-Boring Competition in Bastrop, Texas, the TUM Boring team hit a new milestone, with their machine achieving a bore length of 22.5 metres and setting a new competition record. It secured them not only the overall win but a place in the history of cutting-edge tunnel construction. Three competitions, three clear victories, and each by a wide margin. It's a testament to the team's tireless dedication, technical ambition and strong partnerships, such as the one with KAESER. "This success confirms that we're on the right path, as a team and with our concept," says Felix Blanke with pride. "It shows what can be achieved when passionate people work together towards a shared vision."



The TUM Boring team has now taken part in the "Not-a-Boring Competition" three times.

Engineering meets ingenuity

At the core of their new design is the "Power Pipe" – the lead tunnel section housing all systems required to power the cutting head. This rotating head excavates the soil as it advances, pushed forward by a hydraulic press frame that also drives the tunnel lining. "The spoil is extracted centrally using a suction excavator," explains Technical Director Anton Vierthaler.

It may sound simple, but this breakthrough is the result of months of intensive development. The team significantly increased the torque at the cutting head, relocated the

ed foam to reduce stickiness – and this is where another key player entered the story: the MOBILAIR M 65 from KAESER.

This portable compressor not only cleans the cutting head, but also foams the soil conditioning agent – a crucial process for maintaining steady progress in difficult ground conditions. "When it came to selecting a compressed air partner for our project, KAESER was our first and only choice," says Project Manager Felix Blanke. "That was partly based on recommendations from other companies in the tunnelling industry, but also because we needed

Brewery trusts in KAESER KOMPRESSOREN

When Norwegian heritage brewery Ringnes AS set out to modernise the compressed air system at its Gjelleråsen site, it turned to KAESER for support. This close collaboration resulted in a reliable, energy-efficient compressed air system that also boosts operational dependability – a winning solution for Norway's largest brewery.

Ringnes, a traditional Norwegian brewery and part of the Carlsberg Group since 2004, is renowned for its extensive beverage portfolio – with its pilsner standing out as a signature product and one of the best-selling beers in Norway. Alongside pilsner, the brewery also produces a broad selection of beers, including lagers, bocks and seasonal varieties such as Juleøl (Christmas beer). Founded in 1876 by brothers Amund and Ellef Ringnes, the company also offers a host of alcohol-free beers and malt beverages. Other well-known brands such as Pepsi Max, Solo, Farris, Imsdal, and Frydenlund also form part of the Ringnes product range.

Each year, the Ringnes facility in Gjelleråsen, Nittedal, produces nearly 400 million litres of beer and soft drinks. Commissioned in 1994, it now serves as the brewery's central production hub. Compressed air is essential to a wide range of automated processes here – from powering filling lines and conveyor systems to driving cleaning equipment and control systems. To keep operations running smoothly, a reliable, round-the-clock compressed air supply is critical. "If a compressor goes down, it's not just production that suffers – it could disrupt our entire value chain," says Project Manager Marius Fagernes.

Bottom left: In total, there are three two-stage oil-free screw compressors DSG 180-2 with integrated i.HOC dryers.

Bottom right: The SIGMA AIR MANAGER 4.0 is one of the reasons why Ringnes chose a compressed air station from KAESER.

Key factors: SIGMA AIR MANAGER and technical expertise

Five years ago, Ringnes launched the modernisation project for its compressed air system in Gjelleråsen, with Marius Fagernes at the helm. The project aimed to centralise the previously split compressed air stations and create sufficient redundancy in the new system. A particular focus was placed on energy efficiency. When asked why Ringnes chose KAESER for this modernisation initiative, Fagernes replied: "There were two key factors. Firstly, the outstanding features of the SIGMA AIR MANAGER 4.0 master controller. This compressed air management system is fantastic – none of the competitors offered anything remotely comparable. It's incredibly flexible and integrated seamlessly with our systems, giving us full transparency and control. But it wasn't just about the technology. The people at KAESER also made the difference – they were knowledgeable, supportive, and worked with us to develop a solution that's both future-proof and tailored to our plant's needs."

Energy savings and excellent service

Together with KAESER, Ringnes invested a great deal of time in defining the system specifications – from capacity requirements and correct sizing to load profiling and system operation. The objective was to strike the right balance between performance, energy efficiency and future scalability. Part of the modernisation process involved con-



All images: Ringnes AS

People make the difference

solidating the compressed air supply from two separate compressor stations into a single system. "We now have one additional compressor to ensure redundancy, and the machines alternate in operation. This provides us with both flexibility and security," says Fagernes.

The Project Manager is highly satisfied with the outcome: "Reducing energy consumption was very important to us. By implementing a centralised compressor station instead of two separate ones, we were able to achieve a solution that meets

our capacity and redundancy needs. One of the biggest challenges with compressed air systems is the risk of oversizing. KAESER was excellent in helping us find the right balance. When it comes to cutting energy use, having the right people on your team – people who know what they're doing – makes all the difference," he adds. Fagernes also praises the quality of KAESER's customer service, rapid response times and solid technical expertise: "We have a personal relationship with the service technicians who visit our plant. They're independent, technically skilled and very pleasant to work with – that means a lot to us. Another big advantage is that KAESER provides everything under one roof. The various technical departments are easily accessible and the organisation as a whole is very well coordinated. The back office runs smoothly, and everything from spare parts and support to technical expertise is readily available," Fagernes concludes.

One key factor is the SIGMA AIR MANAGER – none of the competitors offered anything remotely comparable.

Marius Fagernes, Project Manager



Image: Adobe Stock

Reliability and redundancy

Coffee excellence, crafted in Germany

Think all coffee beans are the same? Far from it. Each variety demands its own ideal roasting profile – a delicate balance of time and temperature that brings out its unique aroma and flavour. At Joerges, a leading large-scale roastery, this art is mastered through traditional drum roasting and is supported at every stage by compressed air.

The origins of the A. Joerges coffee roasting company date back to 1847. In 1982, the HühSAM family took over the nearly 150-year-old business. Heinz HühSAM, a food retailer and long-time customer, recognised its potential and transformed it into a family-run enterprise with a focus on coffee roasting and distribution. A major milestone came in 2012, when the company moved into its new headquarters and state-of-the-art production facility in Obertshausen, near Frankfurt-am-Main. This opened the door to wider distribution and paved the way for continued growth and nationwide expansion of the Gorilla Kaffee brand. Now in its third generation, the company blends tradition with cutting-edge roasting technology. Initially known for distributing "Minas Kaffee" and the catering-focused "EffEff" brand, the company launched its own in-house label, Gorilla Kaffee, in 2004. Now enjoyed across Europe, Gorilla has become the company's signature brand. In parallel, Joerges has also established itself as a go-to private-label partner, supplying large-volume, high-quality roasts to customers at home and abroad. Gorilla Kaffee has become a symbol of what Joerges stands for: quality coffee, proudly made in Germany. As Managing Director Tim HühSAM, explains, "Our house brand brings together everything that defines great coffee – top-quality beans, balanced flavour, easy preparation – and a variety of blends to suit every occasion, from a quick espresso to luxurious coffee specialities."

Roasting – a job for specialists

At the heart of every coffee roastery lies the roasting equipment. At Joerges, the beans are roasted using a traditional long-roasting method, where the green coffee is roasted for 18 to 19 minutes – a particularly gentle process that ensures superior quality. Behind the scenes, the production of roasted coffee relies on both technology and expertise to guarantee consistency, quality and

efficiency. The roast master, a seasoned expert, defines temperature profiles for each blend or variety. These profiles guide the development of heat over time to trigger the desired chemical reactions within the beans and unlock the right flavours and characteristics. Once the ideal roast level is achieved, the hot beans are rapidly cooled using a mesh tray to halt the roasting process and lock in the aroma. The entire roasting process is highly complex and broken down into a series of mostly automated steps. From the arrival of the raw coffee beans through to cleaning, roasting and packaging, compressed air is used at every stage. It starts with the cleaning systems, which remove stones, metal, and other impurities from the raw beans. Dust filters, metal detectors and sieves are cleaned using compressed air. The raw beans are stored in six-chamber revolver silos, whose rotary valves are pneumatically controlled. The valves and flaps on the drum roaster are also powered by compressed air, as is the packaging machine. "Compressed air is absolutely critical to our operations," says Plant Manager Jochem Kokkelkoren. "Even when we blow out the filters, we need 250 to 300 litres of compressed air per minute.

Top image: Jochem Kokkelkoren inspects the beans in the roasting plant.

Bottom image: The new ASK 34 T SFC rotary screw compressor provides redundancy and meets the roastery's growing compressed air demand.



No compressed air means no production. In total, we require an average of 3 m³/min at a pressure of 7 to 8 bar. Until recently, we relied on an older SK 22 T rotary screw compressor to cover this demand, but we had no redundancy. And with a new cartoning machine coming online next year,



This ensures the system delivers high-quality, application-specific compressed air while maximising energy savings. The compressor's variable speed control system (SFC = Sigma Frequency Control) also plays a key role, automatically adapting compressor performance to match real-time demand. Consequently, flow rate can be adjusted within the control range according to actual compressed air consumption and required operating pressure, ensuring optimal performance at all times. It's therefore no surprise that Managing Director Tim HühSAM is optimistic about the future: "The new rotary screw compressor means we can comfortably and reliably meet our growing demand for compressed air, now and going forward."



Top left image: Top-quality beans and balanced flavour are the hallmarks of the brand.

Bottom left image: The "Gorilla Store" in Obertshausen is A. Joerges GmbH's flagship outlet.

Top image: "Great coffee for everyone" – that's the motto!



we knew we were going to need more capacity." To ensure the system could meet future demand and provide a reliable backup, the company installed a new KAESER ASK 34 T SFC rotary screw compressor earlier this year. Thanks to its energy-saving SIGMA PROFILE, it delivers outstanding efficiency. The integrated refrigeration dryer included in the ASK T series is also highly energy-efficient, only operating when compressed air is being produced.

Compressed air keeps everything running here, which is why total reliability is absolutely essential.

Tim HühSAM, Managing Director, Joerges

Oil-free compression rotary screw compressors – CSG series

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Heart of the system: The optimised SIGMA PROFILE delivers more compressed air for less energy

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