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KLIMATECHNIK

mag

Let there be heat!

Jürgen Reinecke from Germany's oldest heating company brings even Aachen Cathedral to the right temperature

PAGE 10

Cover: Ralf Kreuels; page 2 (clockwise): davis / stock.adobe.com; Gernot Walter, Matti Immonen

Dear readers,

A year ago we set course for the future with our new "one ebm-papst" strategy. We are systematically working to become even more efficient and flexible so that you can continue to count on us as a strong partner for your needs—all over the world.

One of our especially important strategic projects involves granting the Asia and Americas regions more autonomy in development, sales and production. We are also strengthening our position in these regions; investments of more than 200 million euros in capacity expansion send a clear message.

A good example of our local-for-local approach is the new plant being built in Xi'an, where will we begin to produce solutions for the Asian market in the summer of 2019 at a 27,000-square-meter facility, the fifth ebm-papst location in China. We are also pushing localization in the United States, where we are looking for a second location.

All of these measures will help us to continue with the optimal fulfillment of orders from our customers. The stories in this issue provide a few insights into the work being done.

Stefan Brandl

CEO OF THE
EBM-PAPST GROUP

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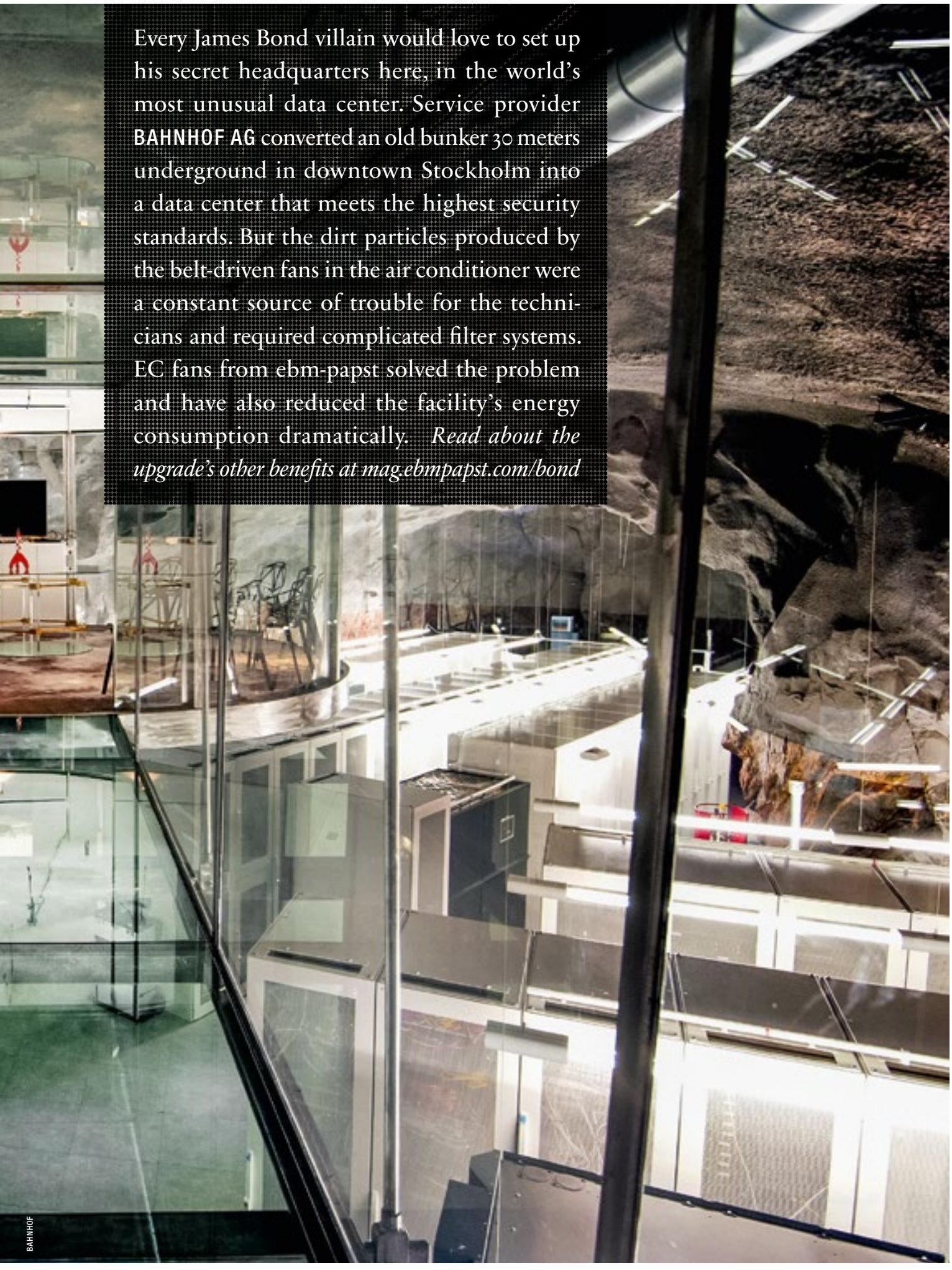
So fascinating, so far away: About 1,500 light-years from Earth, the Orion Nebula with its huge clouds of hydrogen is an ideal place for new stars to form. At the observatory in the southern German town of Weikersheim, a **RITCHEY-CHRÉTIEN-TELESCOPE** from Alluna Optics provides a view of this unique spectacle. Three compact fans from ebm-papst cool the telescope's primary mirror to enable optimum viewing under all conditions. *Learn more about this galactic project at mag.ebmpapst.com/observatory*

Jens Hackmann



Every James Bond villain would love to set up his secret headquarters here, in the world's most unusual data center. Service provider **BAHNHOF AG** converted an old bunker 30 meters underground in downtown Stockholm into a data center that meets the highest security standards. But the dirt particles produced by the belt-driven fans in the air conditioner were a constant source of trouble for the technicians and required complicated filter systems. EC fans from ebm-papst solved the problem and have also reduced the facility's energy consumption dramatically. *Read about the upgrade's other benefits at mag.ebmpapst.com/bond*

BAHNHOF

Tandem on four wheels

When car lovers talk about the latest generation of the Mercedes Benz A-class, topics often include its chic interior or its innovative voice control system. But hidden under the hood are many refinements to reduce fuel consumption that are just as important for the overall package. One such refinement is a tandem pump from ebm-papst, tandem because it actually consists of two individual pumps. That means it can take on two jobs at once. When the automatic start/stop system is activated, the tandem pump ensures that the transmission remains well lubricated even when the engine is off. And it assists the dual-clutch transmission with gear switching as needed.

When no assistance in shifting gears is needed, the corresponding half of the pump can be switched to idle by changing its direction of rotation. On that note, have a good trip! ●

Daimler AG

"The regulation of fans works!"

Geoff Lockwood has seen through the development of the Energy related Products (ErP) regulation of the EU from the start. He claims that its' success is now at stake.

What's ErP all about?

The "Regulation 327/2011 eco-design requirements for fans driven by motors with an electric input power between 125 W and 500 kW" was published in the Official Journal of the European Union on 6th April 2011 and since then it has had a big impact. It has caused problems but found to actually work: It is estimated that 46,800 GWh of energy or 21,5 Mt CO_2 has been saved since 2012 as a result.

What kind of problems did the regulation cause?

Until then, standards defining energy efficiency limits were not in existence. The naivety and fragmented voice of the fan industry resulted in regulations that are not clearly defined and have unnecessary exclusions. There is one exception in that the regulation retained an important aspect discussed and heavily lobbied against during the study and drafting stage—that the scope includes fans 'integrated in other energy related products'.

Why is this aspect so controversial?

Integrated fans are components that are incorporated inside other products such as ventilation units, air-handling units, refrigeration and air-conditioning units. The opposition claims that this cascading or double regulation of parts and products causes unnecessary burden to their development without any benefits. They claim that efficient components do not make efficient products. Now they are suggesting that this could be clarified by regulating fans shown in catalogues and not regulating fans that are 'bespoke'. A bespoke fan is one that is different to a catalogue fan. Just painting a fan pink will make it bespoke and a loop hole will exist to avoid regulation.

Geoff Lockwood is Technical Director at ebm-papst UK Ltd. and Chairman of the Fan Working Group of the European Ventilation Industry Association (EVIA).

And what's the position of the fan industry?

To exclude integrated fans from the regulation adds an opportunity to avoid the requirement to comply. It would add confusion and multiple developments, e.g. for product lines to make efficient designs where they are seen to be within the scope of the regulation and less efficient ones where they are included within other energy-related products.

What would happen, if integrated fans would be excluded nevertheless?

A large portion of the mentioned savings come from fans integrated in other energy-related products. In some industry sectors more than 90 percent of the fans placed on the market are integrated in other energy related products. A change of the scope to exclude integrated fans will be a step back to 2012, an increase in energy consumption, a loss of investment and jobs and a return to using old inefficient machinery. ●

READ THE COMPLETE INTERVIEW WITH GEOFF LOCKWOOD AT:
mag.ebmpapst.com/lockwood

Heavenly warmth

COMPANY
Theod. Mahr Söhne GmbH

LOCATION
Aachen, Germany

Drafty churches and shivering worshipers? There is a better way. The heating specialists at Mahr produce an indoor climate that is comfortable for worshipers and good for historic structures.

Aachen Cathedral is a special challenge even for a specialist in church heating systems like Jürgen Reinecke.

Ralf Kreuels

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"From a technical point of view, the Aachen Cathedral is hell to heat," says Jürgen Reinecke with a smile as he stands in the chancel and points up at the imposing building's innumerable stained-glass windows. In 1470, the chancel was built onto the original octagon, which dates from 812. "These two structures are actually a very poor match." On the one hand, the massive, thick walls that take no notice of whether it is summer or winter outside; on the other, the chancel with 1,000 square meters of windows where the temperature drops every night. That invariably leads to drafts—exactly what Jürgen Reinecke is supposed to prevent. At Theod. Mahr Söhne GmbH in Aachen, he is responsible for planning church heating systems, which has been one of the family-owned company's main lines of business since 1871 and involves some very special requirements. "A church isn't like a new three-room house that you just install a few radiators in," says Reinecke. "Churches pose very special problems, and for every church there's a different solution."

In principle, heating works the same way in many churches, with hot air flowing from a central heating unit through a duct system in the floor to an outlet into the church. It returns to the central unit in the boiler room via recirculation inlets. Gravity used to be responsible for making that work, meaning the warm air had to flow into the church and back to the heating unit under its own momentum. The result, according to Reinecke, was usually unsatisfactory since it was impossible to uniformly distribute the warm air inside the church using this technique. Since the 1960s, Mahr has therefore been using fans in its systems to direct the air more precisely through the floor grates into the church, and extract it again.

Products just for churches

The Aachen-based company has developed several products specifically for its church clientele, including hot-water air heaters, Mahrcalor heating stations, and light stations that filter the soot from votive candles directly out of the air. "Our hot-water air heaters are actually an improvement of what we've always made, air heaters with a central unit but, in contrast to conventional church applications,

Cathedral architect Helmut Maintz and Jürgen Reinecke give special consideration to organs and historic wall or ceiling art when selecting appropriate heating equipment.

> “A church isn’t like a new three-room house that you just install a few radiators in. Churches pose very special problems.”
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> **JÜRGEN REINECKE** —— THEOD. MAHR SÖHNE GMBH

Left: Mahr’s cellar houses a true treasure: the company archive with information about jobs from the last hundred years.

Right: The heated air reaches the church interior through grates in the floor.

Ralf Kreuels

with a hot water-air heat exchanger," says Reinecke. They are used as pure heating units in churches. A fan circulates the intake air, routing it to the boiler room and blowing the heated air back into the church. "When we reworked our product line three years ago, of course the question of the appropriate fan came up," recalls Reinecke. Winfried Schaefer, regional sales manager at ebm-papst, convinced him of the advantages of RadiPac EC centrifugal fans, which have since been built into Mahr's hot-water air heaters.

The contact with ebm-papst began in the 1980s during the development of the Mahrcalor heating station, a compact heating station that is embedded in the church floor; only the grate through which the air flows into the church is visible. "In addition to fans and filters, these units contain a lot of elements for acoustic insulation. After all, we're in a church here and people don't want to hear noisy machinery during the services," says Reinecke with a laugh. The heating stations are distributed throughout the church for uniform heat input—in the nave and the aisles, and also in the chancel. Initially the heating stations worked with only one fan; later Mahr began to use several smaller fans, which helps to establish an even more uniform temperature distribution inside the church. Now more fans and longer floor grates combine to provide pleasant conditions inside the church. "Depending on size, we now have two to six fans in use. ebm-papst is well positioned there," says Reinecke. The centrifugal fans draw in the air, blow it through a filter into the Mahrcalor station, and bring the heated air back into the church.

"We still produce our products ourselves, so we can quickly and easily make changes to all components."

JÜRGEN REINECKE

Sometimes it takes a submarine

So everything is standard and easily installed? Far from it. "In churches we have to make do with the conditions as we find them and fit our equipment into the existing infrastructure, very much on a case-by-case basis and sometimes just like in a submarine." Producing its products itself is an advantage for Mahr. As Reinecke says, "We have access to all components, so we modify them quickly and easily. That makes us flexible." If standard sizes do not fit in the boiler room, Reinecke and his team make them fit. Besides, the units can be almost completely disassembled. "There's a limit to how far you can go with a fan; it has to fit through the door. But we can modify all of the other structural elements."

If you do not ask …

Since customized solutions also call for specific advice, Mahr has established a Germany-wide sales network to advise church customers on-site. "That's definitely unusual for an installer with its own production," says Reinecke. But for him it is the only way to design the best possible heating system for a church. When an inquiry comes in, the first step is for the responsible sales representative to discuss the exact requirements in the church. He brings a lot of questions with him: How is the

Ralf Kreuels

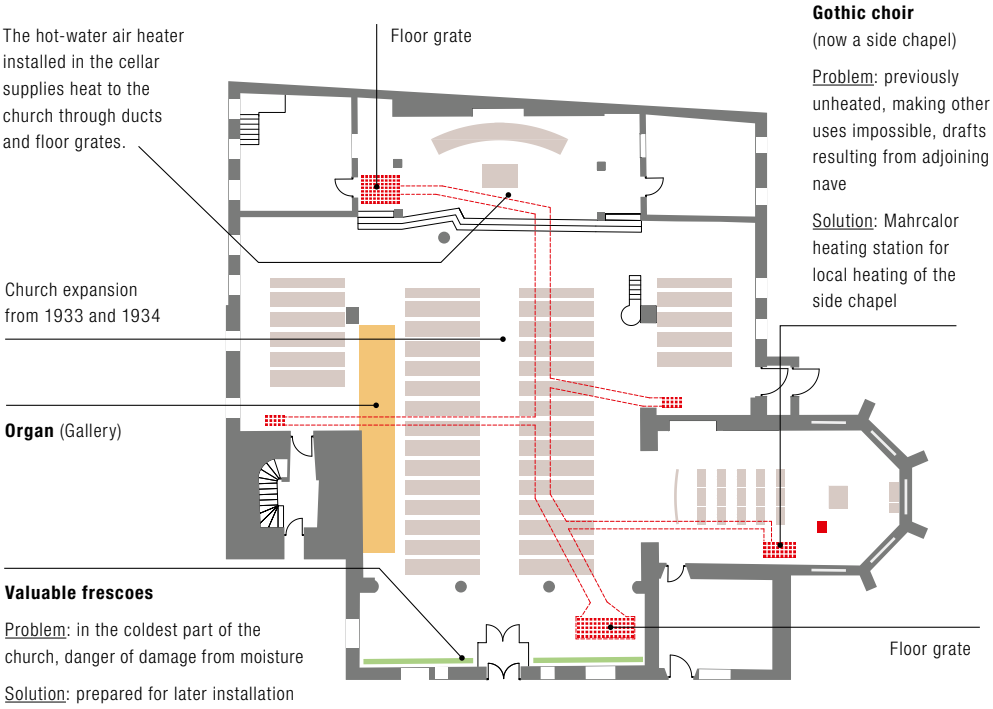
Left: Craftsmanship is standard at Mahr, where versatility enables adaptations for custom solutions.

Far left: The hot-water air heaters have to fit into the existing boiler rooms in the churches. In a squeeze, Mahr makes individual elements fit.

HEAT FOR ST. VITUS IN HEIDELBERG

Mahr used two solutions for the heating system overhaul at the St. Vitus church in Heidelberg. A hot-water air heater provides central heating for the church room added in 1933 and 1934. High-performance RadiPac fans from ebm-papst ensure that the heated air is distributed reliably. The Aachen-based company installed a Mahrcalor heating station in the side chapel; it heats this part of the church locally with separate connections and controls.

CHALLENGES OF CHURCH HEATING



When designing heating systems, Jürgen Reinecke has to reconcile the needs of the congregation, the building and the fittings.

church currently used, and how is it to be used in the future? Should only the church be heated, or the sacristy as well? How does the current system look, and what parts of it can still be used? He also performs a thorough check of the interior layout, looking for possible sticking points. Once these matters are cleared up, Reinecke and his team begin to design the heating system. Besides the size of the room, the building materials also play a role. "I need to make different calculations for single-glazed windows than for thick, uninsulated walls," says Reinecke. "And then there's the unusual way it's used. The temperature in winter is usually kept around ten degrees and then carefully increased for services. You can't model that with standard calculations."

Old treasures and new problems

In addition to the expertise of everybody involved, the heating specialists also have a very special treasure stored in the cellar at the headquarters in Aachen: a huge archive with files full of information about the 17,794 heating systems that Mahr has installed in churches in the past 147 years. In many cases, the archive enables Reinecke to find out about local conditions quickly. A solid foundation, mostly analog on paper and microfilm.

But the specialists from Aachen are confronted more and more often with new challenges. A problem faced by many congregations is excessive humidity in their churches. The reason is not clear yet, but the result is often plain to see: mold growing on altars, organs and walls. Increasingly, Mahr fights it with ventilation units and control systems developed in-house. "We measure the humidity and regulate the systems to establish a better climate," says Reinecke. These measures make it possible to preserve valuable frescoes and historic instruments. However, this is sometimes in conflict with the perceptions of churchgoers. "Nowadays people come from their 22-degree living rooms and drive in their pre-heated cars to a 15-degree church. Of course it seems cold to them. Back when people still had to tramp to church in the snow for 45 minutes, they found eight degrees to be toasty warm," says Reinecke with a twinkle in his eye. "But I can't heat a church with an organ up to 20 degrees. That would damage the organ quickly." The control systems used have a protective function in such cases.

But Reinecke still has plenty of tough nuts like Aachen Cathedral to crack. "It's impossible to get this building completely draft-free," he says. Besides sophisticated technology, lots of good advice is called for. But for that he is very well equipped. ●

Ralf Kreuels

COMPANY
Truma Gerätetechnik GmbH & Co. KG

LOCATION
Putzbrunn, Germany

Deluxe camping in any weather

Driving off with the camper on the spur of the moment to watch the sunset in no-man's-land and enjoy the sound of silence—no problem with a cleverly designed air conditioner and a small, lightweight heater.

Tom Sandner

Tom Sandner has been fascinated for a long time by the idea of also using his car as a house on wheels. At 18, just out of school, he converted his first VW bus into a camper and drove to Italy with three friends. "There's simply nothing better than tossing some clothes and a bike or skis into the car and driving off," says Sandner, who is now 35. "I like being outdoors a lot and being able to decide where to go next on a whim."

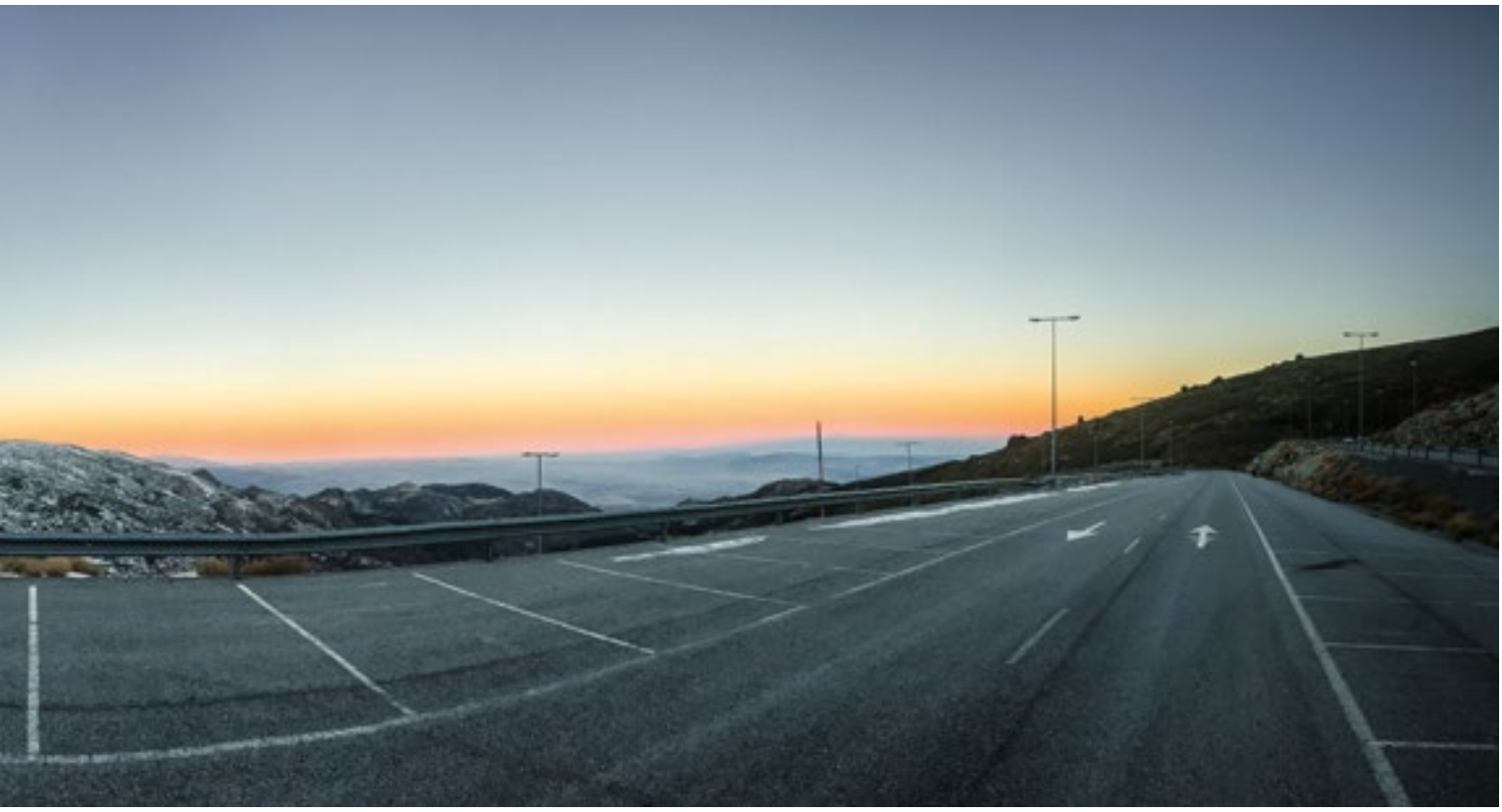
Now Sandner drives a Bresler van on a Fiat Ducato chassis and allows himself more comfort, such as a permanently installed high roof and a heating system with hot-water boiler. They make the vehicle capable of journeys in any weather and during all seasons. Last winter, Sandner drove to Spain and Portugal for four weeks. "In the Sierra Nevada at 2,300 meters, it can easily cool off to minus five degrees at night. Then it's important for the heater to work reliably."

Tom Sandner is on the move outdoors during every free minute. Even in winter.

Sandner can count on that since the heater is from his employer, Truma Gerätetechnik GmbH & Co. KG in Putzbrunn near Munich. A family business founded in 1949, Truma is the market leader in liquid gas heaters for recreational vehicles. Its customers include Hymer, Dethleffs and Fendt—nearly all European motor home and camper manufacturers. The Truma Group is also active internationally, in Europe, China, the United States, Australia and elsewhere.

Small, lightweight and quiet

Truma Combi heaters warm up living areas and heat ten liters of water in a tank. One component, the integrated blower for combustion air, was specially developed by ebm-papst to meet the heater's requirements. "Small, lightweight and quiet were the requirements," says Bernhard Schloderer, who



works in international strategic purchasing. Small because there is not much space in a house on wheels. Lightweight because the permissible maximum weight of vehicles is regulated, and a high base weight automatically means less luggage is allowed. Quiet because the unit is often installed under a bed and should not disturb the occupants. The result is a compact heater that is barely audible and smoothly adjustable as well.

Another requirement is reliability at extreme temperatures. "The unit has to work safely from minus 30 to plus 70 degrees Celsius," says Schloderer. "The blower from ebm-papst is like the Mercedes of its market, exceptionally long-lasting and reliable. That's important to us. No customer would forgive us if he was in the mountains in subfreezing temperatures and the heater failed."

Hot and cold solutions

What is true of cold is also a must for heat: a pleasant climate inside the vehicle even in the summer sun. In addition to the heater, which Truma is developing in cooperation with ebm-papst Landshut, ebm-papst Mulfingen has been delivering centrifugal fans for air conditioners to Putzbrunn for 13 years. Truma then installs them in roof-mounted or storage compartment air conditioning systems. Lightness is crucial for these units as well. Schloderer describes working with ebm-papst as complementary cooperation: "We find solutions together. One can't do without the other."

Cozy homecoming: control via app

Truma has added a special new gadget to its range, an app to control heaters and air conditioners. A freezing or overheated camper is a poor welcome after a day spent on the slopes or the beach. Not a problem, because the temperature can even be controlled from outside. No wonder the trend toward living in a small space, so-called tiny living, is becoming increasingly popular if it means not having to forgo comfort.

Some of Tom Sandner's coworkers do not have campers of their own, but they can still experience some of their company's products at work. Truma makes a pool of ten vehicles available to its employees, who can borrow them for excursions and vacations. Then the valuable experiences gained from traveling end up right where new ideas for improvement get developed. ●

Truma's compact Combi heater heats both air and water.

The storage compartment air conditioner weighs only 23.5 kilograms and can heat and cool thanks to a reversible refrigeration circuit.

Tom Sandner, Truma Gerätetechnik GmbH

COMPANY
Stein Automation

LOCATION
Schwenningen, Germany

Getting there more smoothly

Scratches, wear, noise—when workpiece carriers collide during assembly processes, both products and workers are harmed. So Stein Automation developed a system that moves parts from A to B gently.

The ECI motor is installed on the sides of the conveyors.

Whether it is vacuum cleaners, exterior mirrors for cars, or fans that are being assembled, workpiece carrier transport systems quickly and efficiently bring parts in production environments from one step to the next in the assembly process. Stein Automation, based in the southwest German town of Villingen-Schwenningen, produces components for such systems or supplies fully assembled systems with integrated logistics management on request. Then customers can begin production right away, carrying out orders with just a few mouse clicks. The company offers two systems, STEIN 300 for weights up to 25 kilograms and STEIN 500 for weights up to 60 kilograms.

"Our specialty is Softmove technology for gentle collisions," says Jürgen Noailles, Managing Director at Stein Automation. With other transport systems, workpiece carriers constantly run into stoppers or other workpiece carriers. Products get scratched or, in the worst case, broken. Transport system components wear quickly and annoying noises echo through the manufacturing facility. Softmove technology changes that. It moves the workpiece carriers at three speeds. When moving freely, they travel at maximum speed. If they detect congestion, they slow down. They switch to creep speed for the last two centimeters before a stopper or another workpiece carrier, so they always stop before reaching an obstacle. That makes production quieter, lowers the risk of injury for workers, and saves energy.

Softmove is quiet, lowers the risk of injury, and saves energy.

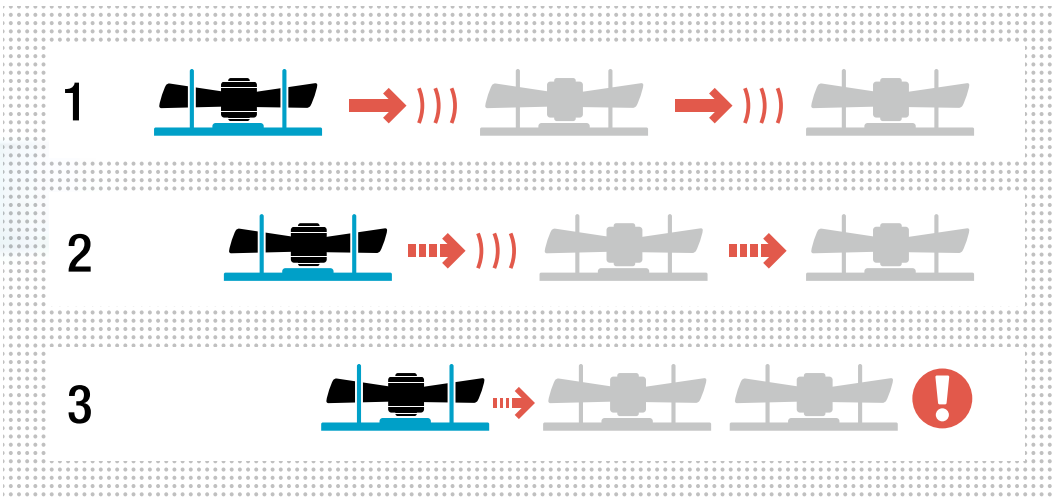
Safer transport for sensitive parts

"Avoiding vibrations is important, especially for sensitive or heavy parts," says Noailles, "for example when liquids have to dry after being applied to electronics, and also for sensitive stators or rotors." ebm-papst was one of the first large customers to use Softmove; it was using workpiece carrier transport systems from Stein Automation as early as 1994. "When we visited the production facilities in Mulfingen many years ago, our contact there told us how important soft collisions were for them," recalls Noailles. "Back then we still used AC gear motors and wondered whether we could also use motors from ebm-papst for our transport systems, to make them even more efficient." So ebm-papst and Stein Automation looked for a motor that is compact and powerful and a considerable improvement over Stein's former EC motor solution. It was also especially important for Stein Automation that the motor feature flexible control and adjustability. Stein found all that in the 63.20 K4 ECI motor with integrated control unit and attached worm gear. ECI motors also feature torque control and high overload capacity. Since the motor regulates torque and current, workpieces of different weights can be transported at constant speed.

Customer-supplier relationship becomes a partnership

Stein Automation uses the motors in both systems, where they are mounted on the sides of the conveyors. The ebm-papst plant in St. Georgen supplies the motor for the workpiece carrier transport systems, which the fan and drive specialist then uses in its own production facilities. "A plain customer-supplier relationship developed into a true partnership," says Noailles. "And that helps our customers reduce energy consumption by up to 80 percent and get their products to their destination safely." ●

Philipp Reinhard



Softmove moves workpiece carriers at three speeds: **1** Maximum speed when moving freely. **2** Deceleration when congestion is detected. **3** Creep speed over the last two centimeters before the obstacle.

Spinning off the grease

COMPANY
Jeven AB

LOCATION
Söderhamn, Sweden

Hovs Hallar, a restaurant in southern Sweden, was looking for a new way to prevent grease buildup in its exhaust ducts. The solution it found was TurboSwing, which flings grease droplets to the side before they reach the duct.

The trick for clean air: TurboSwing grease separators keep air ducts clean and make cleaning easier for the staff.

Patrik Svedberg

C

Clanging pans, sizzling meat, cooks calling out orders—everything is perfectly choreographed when the practiced team cooks dinner for up to 200 guests at the Hovs Hallar hotel restaurant in Båstad, a community in southern Sweden. But perfection is the top priority for more than just the kitchen team. The hotel's director, Waldemar Larsson, sees to it that the hotel's infrastructure is also always up to date. In the past few years, he has installed an environmentally friendly wastewater system in which the wastewater undergoes plant-based rather than chemical treatment, and he uses renewable energy for heating and hot water.

Larsson took another step in the modernization of his hotel in 2016 when he set out to improve the kitchen exhaust system. "We worked for a long time with conventional grease separators," recalls Larsson. "But we always had the problem that grease deposits formed in the exhaust ducts." Not only did that make extraction of the used air more difficult, it also increased the risk of fire in the exhaust ducts. When Larsson looked

for an alternative, he came across the TurboSwing grease filter from Jeven. Its mechanical operating principle immediately aroused his interest.

The disc trick

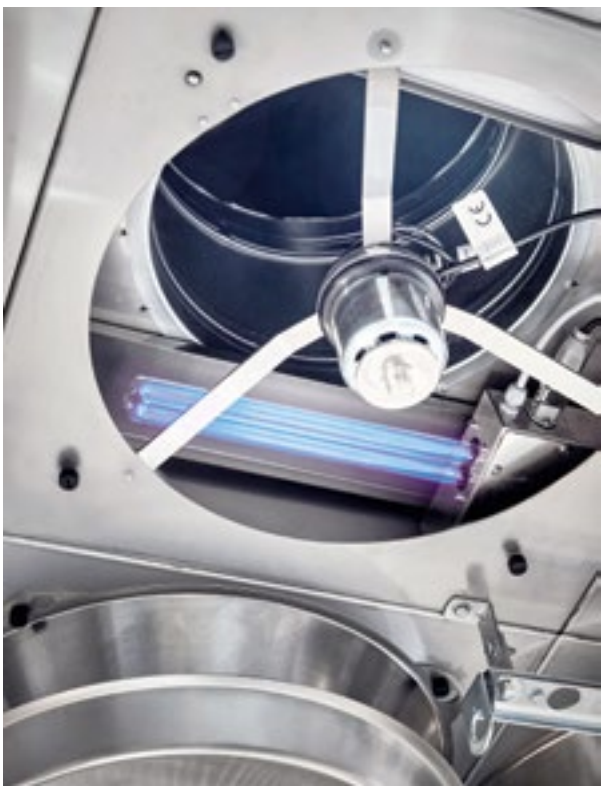
The TurboSwing grease filters are placed right on the air intakes above the cooking areas. At their heart is a metal disc with perforations of different sizes. The disc rotates at up to 1,100 revolutions per minute. As a result of the speed and the arrangement of the holes, the disc flings both large and small (down to four microns) grease droplets to the sides, where they accumulate on the walls of the TurboSwing housing and flow through a channel to a collection tray. The tray can be easily and regularly emptied by the cleaning staff.

Another special feature of the TurboSwing is that with its mechanical operating principle, the filter features a constant level of grease separation independently of the air pressure over its entire operating range from zero to 60 pascals. That means that a restaurant's exhaust system can operate outside peak hours at lower output without cleaning the air less efficiently. And since the exhaust is clean, it can be also fed into a waste heat recovery system, which would be impossible with contaminated air.

The metal disc in the TurboSwing filter is driven by a motor from ebm-papst. The motor, actually designed for a fan, is ideal for this application, as Anders Tingsvik, Marketing Manager at Jeven, explains: "Our first motor in the TurboSwing was very heavy and used a lot of electricity. So we looked to ebm-papst for a lighter and more efficient alternative. The EC motor that we're using now is especially energy-efficient, reliable and quiet."

Quiet grease control

Larsson wanted to see these benefits in action in his hotel, so he had his kitchen converted to work with TurboSwing. "The difference is really unbelievable. There is no more grease buildup in the ducts at all. And the TurboSwing also runs very quietly. The kitchen staff, who stand under the hood for hours on end, really appreciate that." Since the collection tray is easy to empty, cleaning the exhaust system is considerably easier. There is one more thing that shows how convinced Waldemar Larsson is by the system: He has now installed a TurboSwing at home. ●



The latest TurboSwing variant combines mechanical grease separation with UV radiation to remove even the smallest grease droplets from the exhaust air.

The kitchen professionals

"Top ventilation for top chefs" is Jeven's slogan. The company was founded in Finland in 1989. Since then, Jeven has become one of the largest suppliers of exhaust solutions for professional kitchens in schools, restaurants and hospitals in Scandinavia. The kitchen specialists develop, produce and sell their products independently and offer their customers a free design service. The company's latest innovation is a UV version of the TurboSwing. It combines mechanical grease separation with UV radiation, removing even smaller droplets and gases through a chemical reaction with the exhaust.

Patrik Svedberg

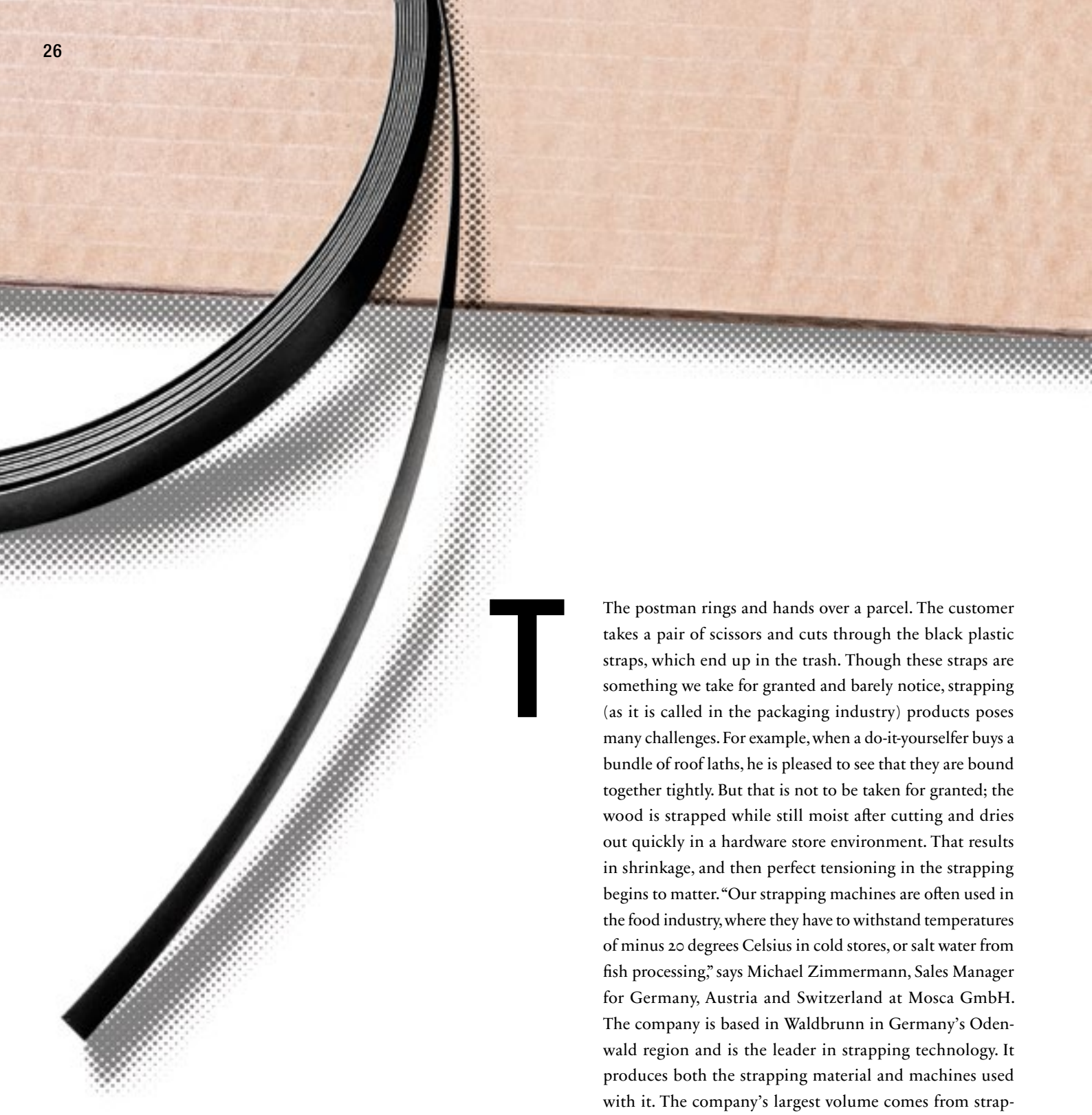
COMPANY
Mosca GmbH

LOCATION
Waldbrunn, Germany

No cardboard characters!

Black strapping has become something we take for granted, but it constantly demands creative solutions from the development team at Mosca GmbH. A prime example is the drive system for their new flagship product for strapping cardboard.

Gernot Walter



The postman rings and hands over a parcel. The customer takes a pair of scissors and cuts through the black plastic straps, which end up in the trash. Though these straps are something we take for granted and barely notice, strapping (as it is called in the packaging industry) products poses many challenges. For example, when a do-it-yourselfer buys a bundle of roof laths, he is pleased to see that they are bound together tightly. But that is not to be taken for granted; the wood is strapped while still moist after cutting and dries out quickly in a hardware store environment. That results in shrinkage, and then perfect tensioning in the strapping begins to matter. "Our strapping machines are often used in the food industry, where they have to withstand temperatures of minus 20 degrees Celsius in cold stores, or salt water from fish processing," says Michael Zimmermann, Sales Manager for Germany, Austria and Switzerland at Mosca GmbH. The company is based in Waldbrunn in Germany's Odenwald region and is the leader in strapping technology. It produces both the strapping material and machines used with it. The company's largest volume comes from strapping machines for temporary strapping during industrial processes—strapping that normal consumers never see. "For example, corrugated cardboard gets strapped up to five times during its production process."

Wanted: an economical jack-of-all-trades

Mosca is particularly proud of its latest strapping machine for corrugated cardboard, the UCB, which is representative of Mosca's creative approach: The machines need to be versatile but remain in the specified price range. After all, customers expect optimum value for money. "We have to implement customer requirements like high-precision positioning or high computing power even with relatively simple components," says Markus Haas, who heads the electrical design department. Servomotors or large amounts of

There are 18 drives installed in the machine, but only five different mechanical designs.

memory are much too expensive for these tasks, so Mosca needs alternative concepts. "That's the 'spice' in our work, but of course it also makes life difficult for us."

The electrical engineers sometimes reached their limits, especially when dealing with the movements of the numerous axes in the machines, as Rainer Ihle, a developer, can attest. "Our dream was to avoid using pre-parameterized motors," he says. "If we use a specially parameterized motor for all of the different tasks, then we have a huge variety of drives in a machine. But there used to be no other way."

That made it difficult not only to control the drives, but also to service them. Once the Mosca technician at the scene had identified the type of drive that was faulty, the search began in Waldbrunn for the right PC tool, the interface adapter, the parameterization and the current version of the firmware. The technicians would then customize the replacement drive and send it to the customer. Then the technician was deployed for the second time, to install the replacement drive. "In the worst case, that sometimes meant the machine was out of service."

An electrifying solution

A solution came into view when Markus Haas became acquainted with the K4 drive regulator at a presentation of the ebm-papst drive portfolio. "It electrified me, and right away I asked the sales representative who had told him what we need. That was exactly the solution we had been looking for." The regulator provides speed, torque and position control, is configurable and is enabled for communication via RS-485 bus system. The Mosca team's dream of electronically neutral installation was almost within reach.

But a few creative solutions were still needed on the software side. For example, to make the drives work with other components in the same bus system. Since the different components do not communicate identically, a sort of translation is needed for different "dialects" of data transmission. Through an assigned address, every drive always knows whether it or another is being addressed and what is to be done. In a pilot project, the team overcame other obstacles on the way to the perfect drive solution. Armed with that knowledge, they began to work on the implementation of the new UCB. "We can only implement our solutions with our experienced development team," says Haas.

The result simplifies handling in general, and also the machine's architecture. Function assignments for the drives can be made at runtime, and their integration in the Mosca bus system also enables condition monitoring. In addition, the new UCB's control box is only a quarter as large as the one on the predecessor machine—with identical functionality. That has many benefits, such as access to the machine.

And service calls are reduced to a few hours, as electronics technician Daniel Treu enthusiastically reports: "There are 18 drives installed in the UCB, but only five different mechanical designs. That's ideal, because a service technician can easily take them along on a service call." When installed, a drive is automatically addressed, parameterized and given the correct firmware when the machine is switched on; it is automatically customized for the function to be performed.

The Mosca team is happy about more than just the solution. As Michael Zimmermann says, "By April we had already sold the quantity we had planned for the entire year, and the customers aren't giving back our prototypes because they work so well." ●

FIND OUT MORE ABOUT MOSCA AND THE UCB IN THE VIDEOS AT
mag.ebmpapst.com/mosca

Gernot Walter

COMPANY
Studio Antti E Oy

LOCATION
Lahti, Finland

Phone booth makes a comeback

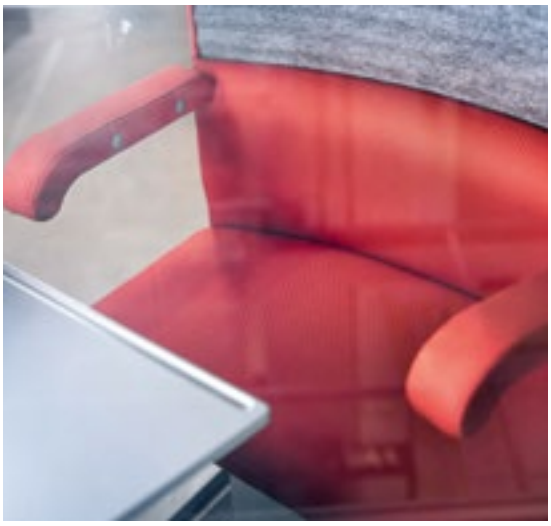
Cell phones have made phone calls possible from any location, but the Finnish designer Antti Evävaara is bringing back the phone booth—and putting it in open-plan offices.

The boss is talking loudly into her phone, the secretary is having a laugh with a customer, and the coworker across the way is banging away on his keyboard—just about everybody knows such situations from open-plan offices. Phoning in such surroundings, and especially in privacy, is just about impossible. The only solution is to head for a phone booth. No, not the traditional phone booth that is only rarely found on the sidewalk anymore. These phone booths are true designer items for the office: the Silence Phone Box and the Silence Stand Box from Evavaara Design, the product line by the Finnish designer Antti Evävaara. His Pesä chair with five legs made it into the Design Museum in Helsinki and made Evävaara famous in the 1980s. Evävaara has been making the Silence line of furniture since 2002, offering places of refuge in airports, hotels, libraries and open-plan offices.

"Now with everybody having a cell phone and open-plan offices in fashion, people need resting areas where they can read, phone or work in peace," says Evävaara. "That's why I design acoustic furniture that leaves the noise outside." He started with the Silence Chair, of which there are 70 at the Frankfurt airport. With its curved shape, roof and safety glass, the chair shields the user completely from ambient noise, and the user's voice cannot be heard by people outside. "The chair isn't optimal for longer phone calls, so a few years later I designed the Phone Box for open-plan offices." Four walls and a door shield the user, and a chair and a table round out the workspace. On request, Evavaara Design also integrates a videoconferencing system. All of this makes the Box perfect for working in peace for long periods—when the air is good. →

Furniture designer Antti Evävaara with his latest product, the Silence Stand Box for short phone calls made while standing.

Matti Immonen



True designer pieces:
Customers can choose
their own colors and
fabrics for their products.

People can work undisturbed for hours and take part in video conferences in the Silence Phone Box.

"The air is exchanged completely within a minute, and you don't even notice it."

ANTTI EVÄVAARA —— INVENTOR OF THE "SILENCE" FURNITURE AND MANAGING DIRECTOR OF EVAVAARA DESIGN

Fans against fatigue

"The CO_2 level in the Phone Box can't be allowed to get too high, or people will get tired and can't concentrate," says the designer. So there are fans on the Box to exchange the air regularly. But no tests were performed to verify whether the fans were strong enough to keep the CO_2 level down. That changed when a big order materialized. "At the beginning of the year, Antti Evävaara contacted us and asked us to measure the CO_2 level in the Silence Phone Box," recalls Jukka Blåfield, technical director at ebm-papst Oy in Finland. He knew the company from a joint effort to develop a glass compartment for smokers, which failed due to regulations. "We used a sensor to determine how air quality changes when a person sits in the Box for a while. We noticed that the fan's air flow was insufficient because the carbon dioxide level rose too much over time."

So ebm-papst replaced the AC tangential blower with a stronger RadiCal centrifugal fan. "We adjusted the EC fan's air flow so that the air quality was good but its noise level was as low as possible," says Blåfield. Evävaara borrowed the sensor, tested the new fan a bit more, and then decided to integrate it into the Silence Phone Box. He also uses the centrifugal fan in his latest product, the Silence Stand Box, which is designed for short phone calls made while standing. "The air is exchanged completely within a minute, and you don't even notice it," says Evävaara proudly. And so people can stay productive longer.

From wool to leather

The Silence Phone Box has been installed in the offices of Finnish real estate agents, in law practices where confidentiality is obligatory, and in open-plan offices at Google in London and Paris. "The ones at Google are blue outside, have a red seat, and yellow and green handles," says Antti Evävaara. The designer considers it important that the Boxes are not merely functional but are also high-quality furniture. "The customers can select the materials—from wool to leather—and colors for the Phone Box themselves," he says. Many different kinds of wood are used for the Stand box.

Evävaara has designed six different Silence products for various purposes. All have one thing in common: They promote harmony where many people come together, and they make our loud world a little quieter. ●

YOU CAN VIEW MORE PICTURES FOR THIS STORY AT
mag.ebmpapst.com/phonebooth

Matti Immonen

COMPANY
Alfred Kärcher GmbH & Co. KG

LOCATION
Winnenden, Germany

Time for a hot shower!

Alfred Kärcher GmbH & Co. KG

Stationary hot water high-pressure cleaners from Kärcher blow away even the toughest dirt easily. They use a burner with an ebm-papst gas blower to heat the water.

When talking about Kärcher high-pressure cleaners, many people think about the compact yellow household helpers that spotlessly clean patios, façades or garden furniture. But Kärcher also offers a wide range of products for professional applications, including stationary hot water high-pressure cleaners. They are used wherever lots of cleaning needs to be done often, for example on large farms, in the food processing industry, or the automotive industry. They work much differently than the units used in private households. Pressure and hot water are centrally produced by stationary systems and supplied via piping to various dispensing points where the users attach high-pressure hoses and attachments before cleaning.

Cleaning without chemicals

"The hot water enables fast and thorough cleaning without any chemical aids," says Steffen Burger, Product Manager for stationary high-pressure cleaners at Kärcher. "Ideal cleaning results vary from case to case depending on the pressure and the amount of water used." At a maximum pressure of 140 bar, the hot water high-pressure cleaner uses up to 1,200 liters per hour, heating the water up to about 80 degrees Celsius. However, very good results can often be achieved at only 60 degrees. Then the user saves energy without having to accept lower quality. There are two basic designs for the hot water high-pressure cleaner; one heats with oil and the other with gas. Though the oil version is more common, the gas version is better suited for facilities with especially high cleaning volumes. "Of course another requirement is a gas connection on site," says Burger. "When that is available, the gas version is more economical in the long run because gas is the cheaper energy source." Kärcher produces the components for oil combustion completely on its own, but it cooperated with ebm-papst on the blower for the gas version. Burger says, "ebm-papst has great expertise in this area, so we're glad to have them as a strong partner." Burger considers it a further advantage that ebm-papst constantly refines its products, taking relevant safety aspects into consideration as it does so. "That means we can be sure that the blowers always satisfy the latest legal regulations and that the sensitive issue of gas is in good hands."

The efficient combustion enabled by the ebm-papst RG 148 blower is also a plus for Kärcher's customers. "We mainly sell the gas version of the stationary high-pressure cleaners in Europe," says Burger. "The overall efficiency of a system is important to this target group, and every single component makes a contribution to that." ●

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When selecting the most suitable motor for dynamic applications, the effective torque is a crucial quantity.

$$M_{eff} = \sqrt{\frac{M_A^2 \times t_A + M_L^2 \times t_L + M_{Br}^2 \times t_{Br} + M_{St}^2 \times t_{St} + \ldots + M_X^2 \times t_X}{t_A + t_L + t_{Br} + t_{St} + \ldots + t_X}}$$

Markus Flaig, Head of Development for Industrial Drives

Jörg Hornberger, Development Specialist for Industrial Drives

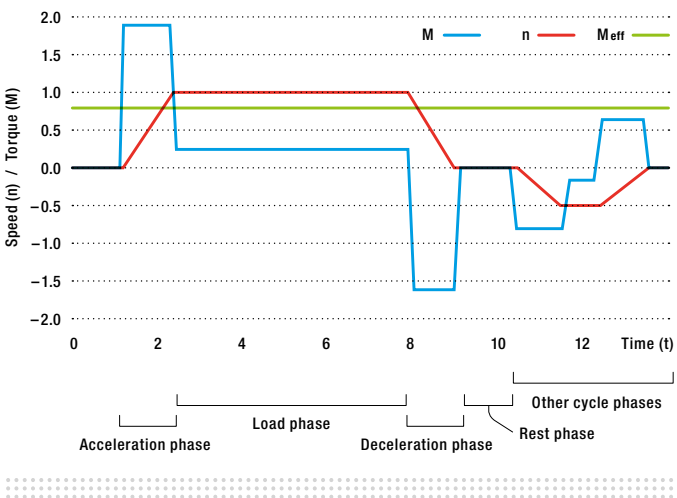
In many applications, a motor's continuous output is limited by its thermal budget. Optimum design is crucial to keep a motor from overheating in an application. The rated torque is usually used during design. However, that is based on a motor running in continuous operation at a clearly defined operating point with constant speed and constant torque. In this case, a state of thermal equilibrium will be reached after a certain period.

But in many applications, especially in dynamic operation, the operating points change constantly. An example is a shuttle in a high-bay warehouse. As soon as it receives an order to retrieve stored goods, it accelerates from its starting point to the required speed. Then it moves at constant speed toward its destination and decelerates to come to a stop at the required position. Different torques are required for the acceleration, constant speed and deceleration phases. This example illustrates that for dynamic applications, more parameters need to be taken into account during design than for the simple case of continuous operation: torques for acceleration, constant speed and deceleration, and times at rest.

The formula for effective torque shown above is an idealization of such cyclical operation. M_A and t_A represent the starting torque and the start-up time; staying with our example, the acceleration phase for the shuttle. M_L and t_L represent the load torque and the travel time to the destination, while M_{Br} and t_{Br} account for the deceleration phase. With t_{St}, the time at rest (without torque) is also accounted for. The formula can be expanded as needed depending on the actual cycle, making it possible to determine the corresponding effective torque for continuous operation. That allows an assessment of whether the selected motor is suitable for the application. The effective torque for the application has to be less than or equal to the rated torque of the selected motor.

The effective torque is an aid in the selection of a suitable motor. In motor development, we use representative operating points (continuous operation) for the design and characteristics of the various motor sizes. They are based on empirical values from actual applications. ●

EXAMPLE CYCLE FOR EFFECTIVE TORQUE



Biking to work

ebm-papst has been offering company bikes to its employees since 2013. The idea has been well received and keeps the workforce fit.

News reports about changes in tax law are among the more boring kinds of reading. But Kai Gebhardt was captivated immediately when he read at the end of 2012 that the tax break for company cars was to apply for leased bicycles, e-bikes and pedelecs as well. "That would be a good thing for our employees," thought the Head of Human Resources at ebm-papst Landshut. Gebhardt is an enthusiastic cyclist himself, riding 20 kilometers to work every day. So he read up on the matter, looked for a leasing company and spoke with a bicycle dealer. Half a year later, he presented his concept to the staff on Health Day.

It works as follows: The employee chooses a bicycle and the employer pays the monthly leasing fees, which are listed as deferred compensation on the pay slip. In the end, every employee saves money because a lower tax rate applies for the leasing. When the leasing contract expires, the employee can buy the bicycle for a minor sum.

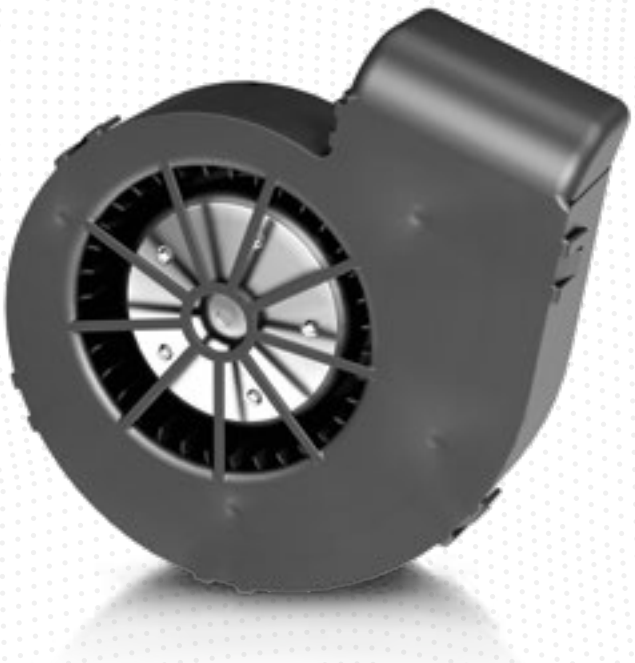
Kai Gebhardt, Head of Human Resources at ebm-papst Landshut, cycles every day himself.

The idea was well received; today about 300 employees in Landshut, over a quarter of the workforce, have a company bike. Germany's bicycle club ADFC has certified ebm-papst Landshut as a "bike-friendly employer" twice. To earn this designation, a company must fulfill numerous criteria. These include having enough bicycle stands or bike-related activities. For example, every year about 150 employees take part in a bike rally in Landshut that is dedicated to climate protection. "We recently installed a charging station for e-bikes, which also scores points," says Gebhardt.

Gebhardt notes another positive effect of the company bikes: "The people with bikes have a lower average sick rate of 3.67 percent compared with 5.94 percent for the rest of the workforce." The locations in Mulfingen, St.Georgen and Lauf now offer the company bike plan as well. ●

COOLING THE BACK

The RL 5X centrifugal fan is the compact solution for car seat ventilation. Even in complex seating systems with limited space for installation, it works with low vibration and structure-borne noise generation, making it practically inaudible during operation. Thanks to its high pressure increase, the required air flow reaches the driver even through tightly woven fabric for a pleasant cooling effect on the back.

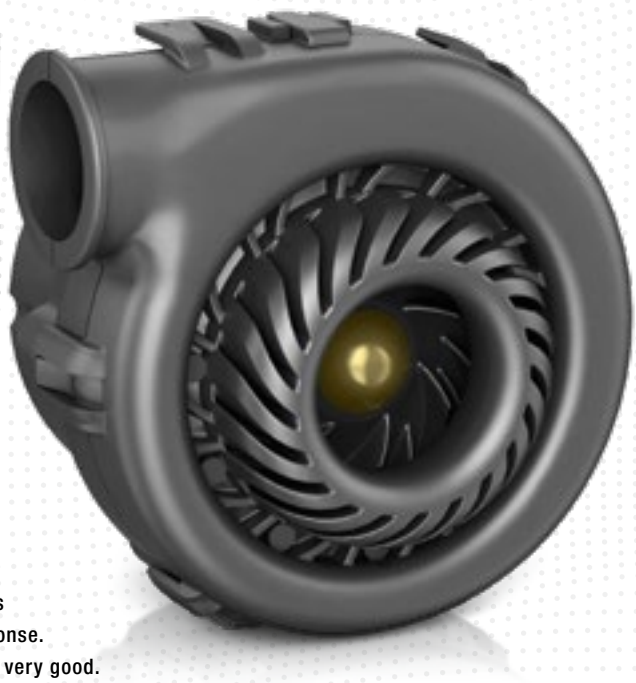


MAKING TWO OUT OF ONE

The latest version of the NiQ can be operated at voltages from 100 to 240 volts. Two different versions used to be needed for this. Now customers all over the world can make use of the motor's benefits more easily: high efficiency, cost-effectiveness, and use in areas with indirect food contact. For example, driving axial fans in refrigerated display cases with uncovered vegetables.
www.ebmpapst.com/niq

ATTRACTIVE HELPER

The RV45 centrifugal fan was specially developed for medical respirator applications. In spite of its small size and low operating noise of only 49 dB(A), it can adjust its pressure increase very quickly thanks to the newly developed motor that also makes it suitable for industrial applications with high demands on reliability and response. And if that is not enough, it also looks very good.



"Flexible and compact"

RadiMix gas blowers are perfect for heating modern buildings. Frank Schlopakowski, Head of Design Department R&D at ebm-papst, explains why.

What makes the RadiMix gas blower special?

The RadiMix series includes four sizes: VG 71, VG 100, VG 108 and a size that is still in the development phase. What they all have in common is unusually high flexibility in terms of power range and modulation at high efficiency. Their efficiency is five percent higher than that of comparable products on the market. Last but not least, they are very compact, quiet and eco-friendly.

Where are the gas blowers used?

Gas blowers are ideal for the gas-condensing units used for heating modern residential buildings. These units supply thermal energy quickly when it is needed and cut back just as quickly. For example, when the whole family needs hot water to shower in the morning, the high performance is there, and at night the heating system reduces its output, which is good for the environment and lowers the heating costs. With their high modulation bandwidth, our RadiMix gas blowers meet these requirements perfectly.

What other benefits do customers have?

Better aerodynamics and a new, more efficient motor make the RadiMix gas blowers very compact. That means our customers, the producers of condensing boilers, can offer smaller units without compromising on performance and convenience. Our new gas blowers are not only adjustable to a wide range of performance requirements, they can also be adapted to various installation scenarios. For example, the side panel is made of sheet steel instead of the usual die-cast aluminum. That enables custom and always optimal positioning of the electrical hookups on the motor side. The gas mixing unit, the so-called venturi mixer, which can be optionally positioned in the intake area on the housing, can be customized to customer requirements. In addition, the RadiMix series is quiet compared with the previous blowers.

How was it possible to make the high-performance blower so quiet?

In addition to reducing airborne sound, we focused on reducing vibrations. Using modern development tools, we were able to optimize the isolation from vibration. The sturdy motor cover, which is decoupled from the drive, also contributes to a low noise level.

How does the blower fit with smart home concepts?

The electronics have been completely redesigned and can be integrated in digital systems through optional bus interfaces. That makes it easy to analyze parameters like output, temperature, service status or operating voltage. The stored data enable both preventive maintenance and remote troubleshooting. ●

YOU CAN FIND MORE PRODUCT INFORMATION ABOUT THE RADIMIX GAS BLOWER AT
ebmpapst.com/radimix

5%

higher:
the efficiency
of the VG 100 compared
with similar products
on the market.

CONVENIENT

All operating parameters are easily read out.

The VG 71 is one
of four blowers
in the RadiMix
platform.

Space saver

Better aerodynamics
and more efficient motors make
RadiMix gas blowers unusually compact.

1:10

Modulation ratio of a VG 100
in the range from 3 to 50 kW

Digital

Data collected
by the control unit
can be used for
preventive maintenance
and remote
troubleshooting.

Gernot Walter

WOULD YOU HAVE RECOGNIZED IT? —— THE RADIMIX GAS BLOWER IS FLEXIBLE AND COMPACT. TAKE A LOOK INSIDE ↑