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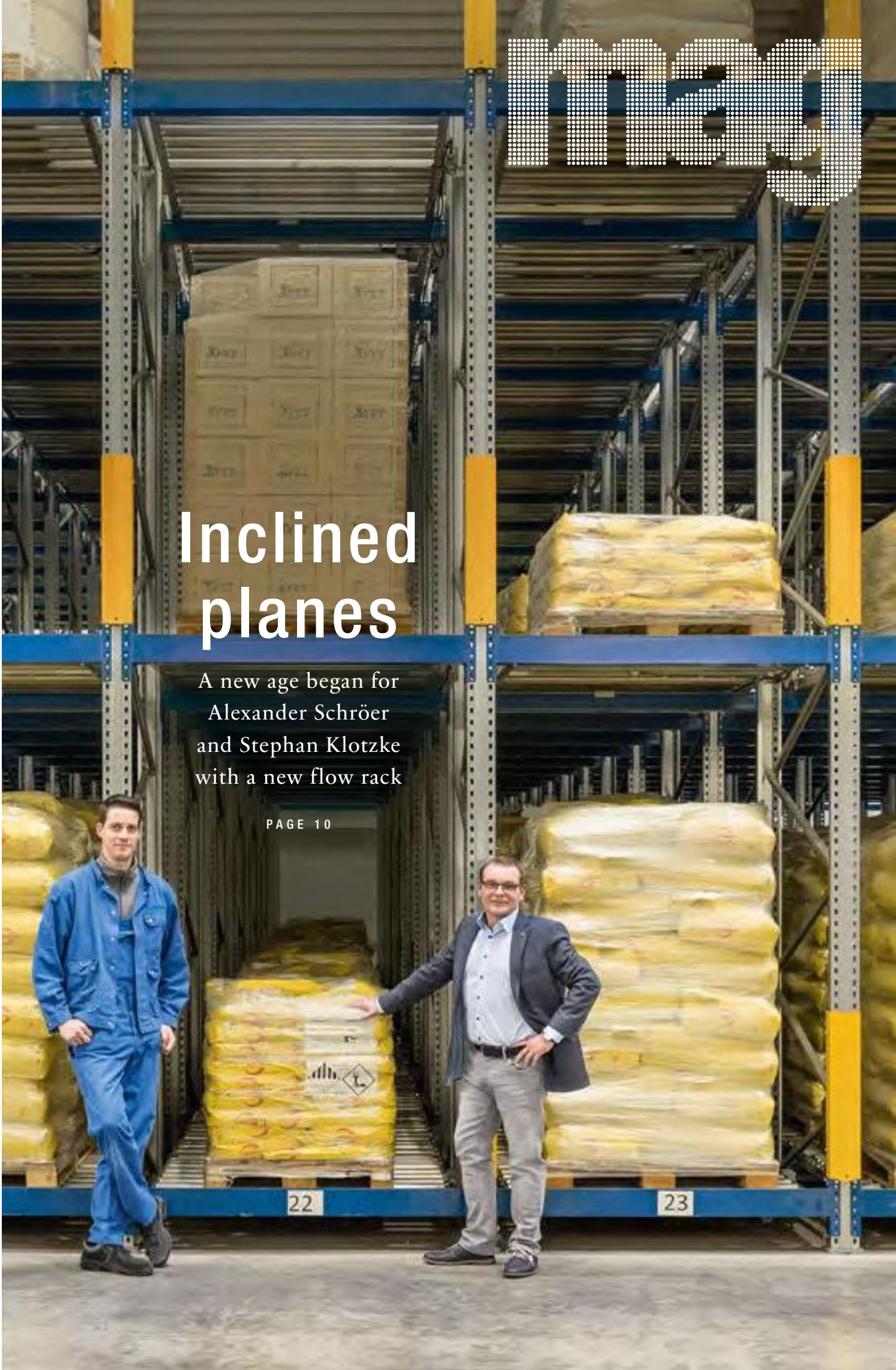

Inclined planes

A new age began for Alexander Schröer and Stephan Klotzke with a new flow rack

PAGE 10

Cover: Jan Hosan; page 2 (clockwise): Jan Hosan, Gernot Walter, Ralf Kreuels

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4 In the next few pages, you can learn about an auxiliary air conditioner for trucks and cooling for the lasers used in light shows. Later comes an article about cooling optical fiber network nodes. The wide range of applications you can discover in this issue of our customer magazine bears witness to your trust in our products, for which I want to take this opportunity to thank you. Only this trust makes our success possible and gives us the chance to address such a variety of market segments and applications.

17 The case of a cleaner for LP records shows how enthusiastic we are about finding solutions for exotic applications. Working with people who like to tinker with things is important to us. As a large company, we constantly benefit from the new perspectives and different thought processes offered by such cooperation. Not only does this give us inspiration, it also expands the experience and expertise that help us to find ideal solutions for all of our customers.

That's why we make a point of working with companies of all sizes and also satisfying the needs of relatively "minor" companies, and that's why I'm calling on you to challenge us here as well.

Thomas Borst

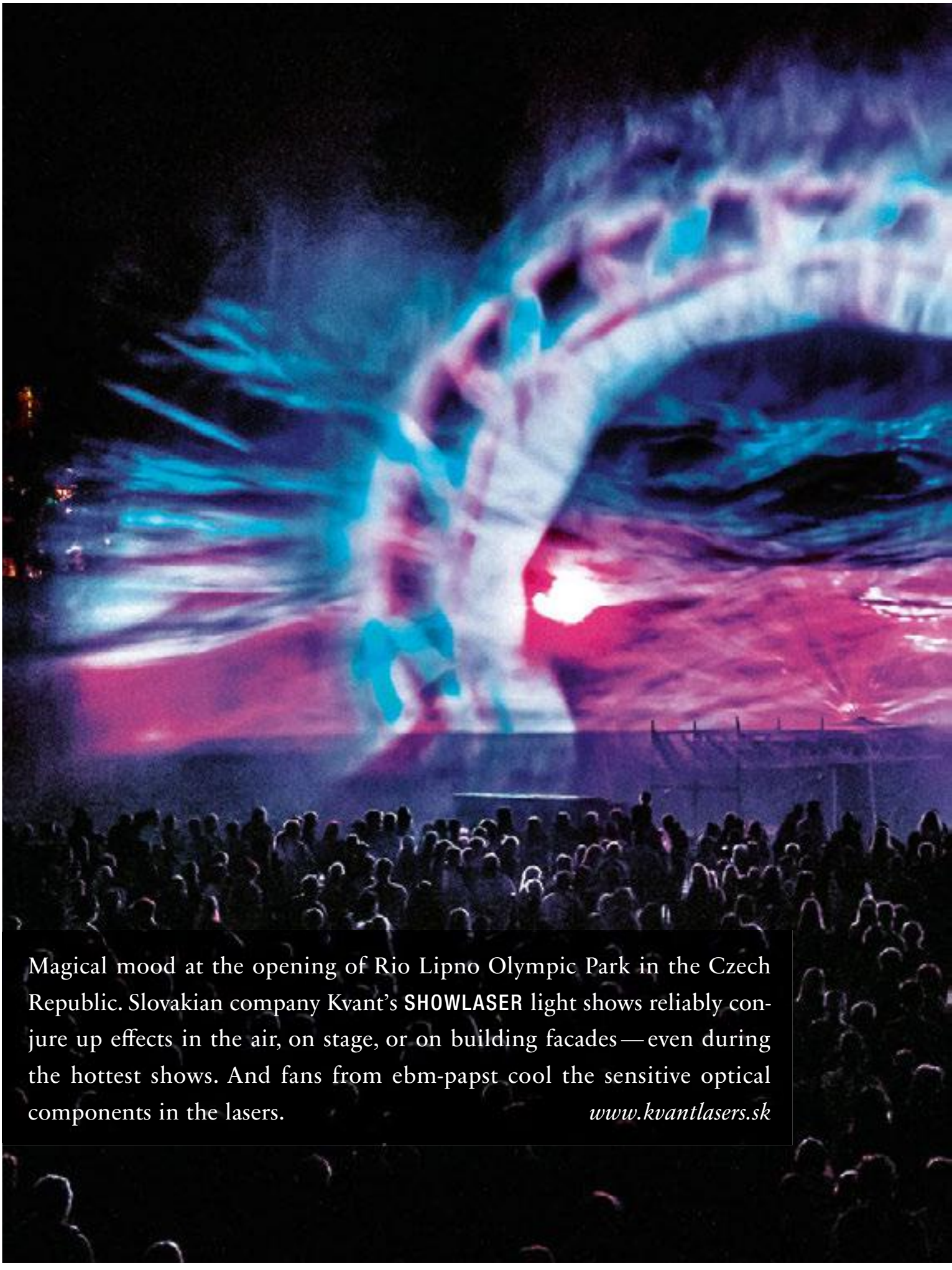
MANAGING DIRECTOR
SALES AND MARKETING
EBM-PAPST GROUP

CONTENTS


Domenic

Just relax at a rest stop: Dometic is setting new standards with its latest generation of the **COOLAIR AUXILIARY AIR CONDITIONER** — more cooling power longer. Now truckers can stay cool during a break, even with the engine switched off in sweltering heat. The RTX1000 can cool a cab with 1,200 watts for up to twelve hours at central European temperatures. And in eco mode, the RTX2000 can keep going with up to 2,000 watts for an entire weekend. ebm-papst modified the fans in its evaporator and condenser so that they not only work extremely efficiently but are also prepared for ice, rain, snow and other weather conditions. The technology has been field-tested in Australia. *Read the entire user story at mag.ebmpapst.com/dometic*

Dometic Group AB

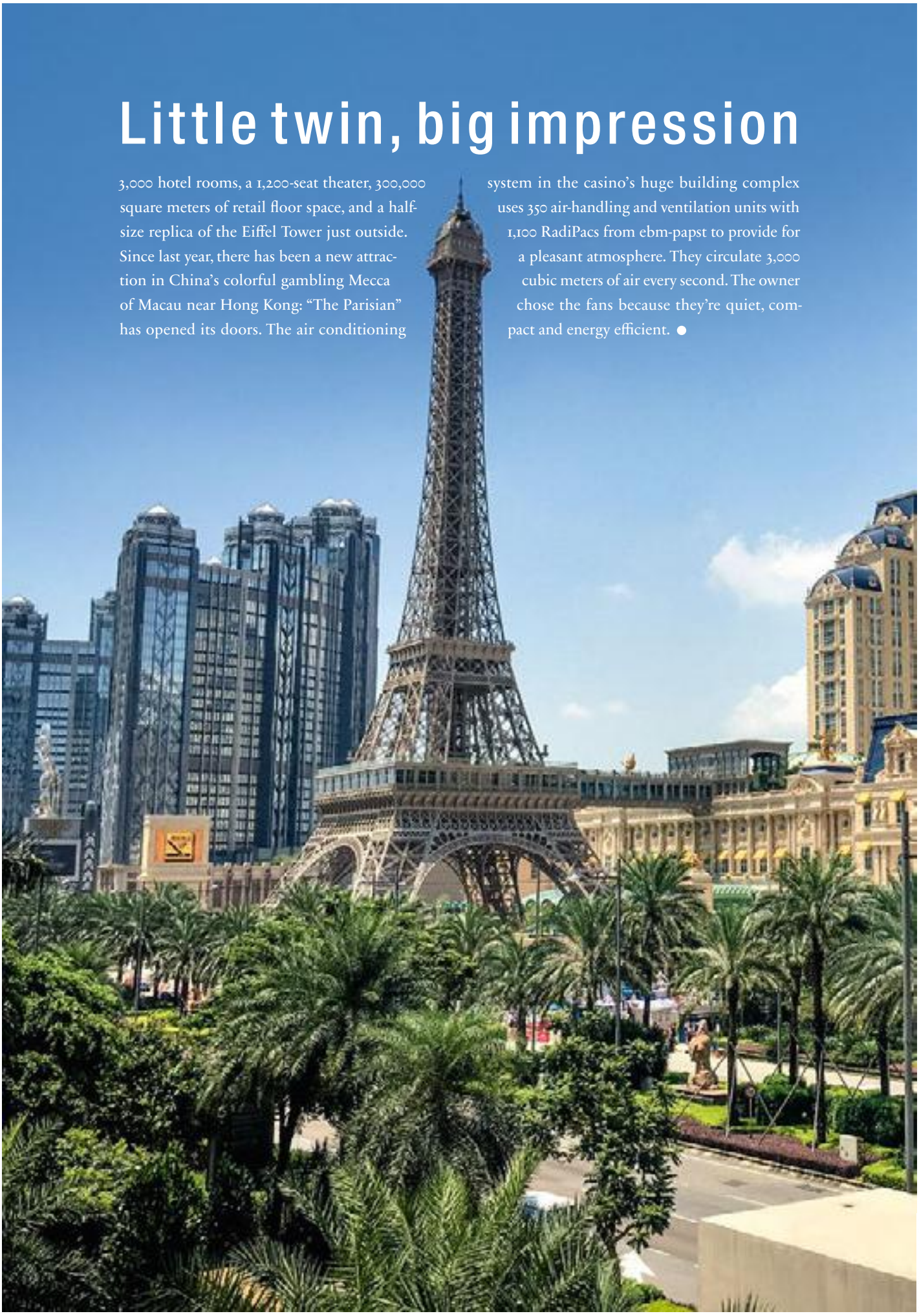


Magical mood at the opening of Rio Lipno Olympic Park in the Czech Republic. Slovakian company Kvant's **SHOWLASER** light shows reliably conjure up effects in the air, on stage, or on building facades — even during the hottest shows. And fans from ebm-papst cool the sensitive optical components in the lasers. *www.kvantlasers.sk*

Kvant

Little twin, big impression

3,000 hotel rooms, a 1,200-seat theater, 300,000 square meters of retail floor space, and a half-size replica of the Eiffel Tower just outside. Since last year, there has been a new attraction in China's colorful gambling Mecca of Macau near Hong Kong: "The Parisian" has opened its doors. The air conditioning system in the casino's huge building complex uses 350 air-handling and ventilation units with 1,100 RadiPacs from ebm-papst to provide for a pleasant atmosphere. They circulate 3,000 cubic meters of air every second. The owner chose the fans because they're quiet, compact and energy efficient. ●



Saiver / Welcome Air-Tech

»We have to stay active and keep reinventing ourselves«

Stefan Brandl (48) became Chairman of the Board of Directors of the ebm-papst Group in January 2017. An interview with the sales pro and innovator makes clear the path to be taken by ebm-papst.

Mr. Brandl, what will change with you in the top position?

Everything will change that a company needs to change in order to react nimbly to market trends, and of course my board colleagues and I have been working on our Strategy 2020 since mid-2016. Its cornerstones include growing the Group together, establishing speedy units close to the customer, and expanding our market and technology leadership. In addition, we want to position ourselves more strongly in the growth regions of Asia and North America — not just for sales but also with R&D and production facilities.

What will it take to expand the company's technology leadership?

Along with efficiency improvements, digitalization will be the decisive factor. Our products are already prepared for Industry 4.0 now and play an important role in the smart home. Today we already generate 40 percent of our revenue with products that are less than three years old. With our above-average R&D investments of about ten percent of revenue, we'll continue to improve our rate of innovation. The focus will be on the transition from component supplier to systems provider. With fans, we'll concentrate on further efficiency increases through better aerodynamics.

Christa Henke

Stefan Brandl studied electrical engineering with focus on energy technology at the University of Applied Sciences in Schweinfurt. He began his professional career at ebm-papst in 1991. He has been Managing Director of ebm-papst Landshut since February 2007.

What qualities are important to you for contacts with customers?

We need to be first-class listeners, we have to understand what the needs of our customers are and then implement them precisely with an efficient solution. A solution with which our customer can significantly reduce its operating costs or increase its performance. In the ideal case, it can do both. I will make every effort to help ebm-papst further expand its leading position as number one in the international market for fans and motors. We can do that if we continue to be an active company that keeps reinventing itself. ●

Orderly throughput

Stephan Klotzke, area sales manager at Bito Lagertechnik, and Alexander Schröer, head of engineering at Miavit, inspecting the new pallet flow rack.

COMPANY
Miavit GmbH

LOCATION
Essen (Oldenburg), Germany

A new pallet flow rack gives feed supplier Miavit high throughput with absolute product safety. And since the flow levels have only half the usual slope, the company also saves several hundred thousand euro.

Jan Hosan

Jan Hosan

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Goods delivered with swap trailers are placed on the sorting conveyor by a forklift. The conveyor checks the weight and condition of the pallets and moves them to …

C

Cloppenburg district, in the middle of the flat Lower Saxony countryside. There are farms every 500 meters on both sides of the highway with big, flat barns next to the brick houses. For every one of the 165,000 people living in this region southwest of Bremen, there are 87 farm animals. Agriculture dominates the district, where nearly two million pigs, 170,000 cattle, nine million chickens and three million turkeys are kept. Their health is of great importance to the region.

Prevention instead of medication

That was already true 50 years ago, when the veterinarian Dr. Hans Niemeyer began working intensively with premixed animal feed. His motto was "prevention instead of medication." Soon he founded Miavit. The company's name stands for minerals, amino acids and vitamins. Since 1964 it has become Germany's market leader for premixed animal feed, which it produces in many different forms (tablets, powder, liquids) and quantities at its headquarters in the quiet town of Essen (population 8,000). In recent years, the company has been supplying more and more customers from all over the world. Now exports account for 50 percent of its revenue. The family-owned business with 360 employees was beginning to reach its limits.

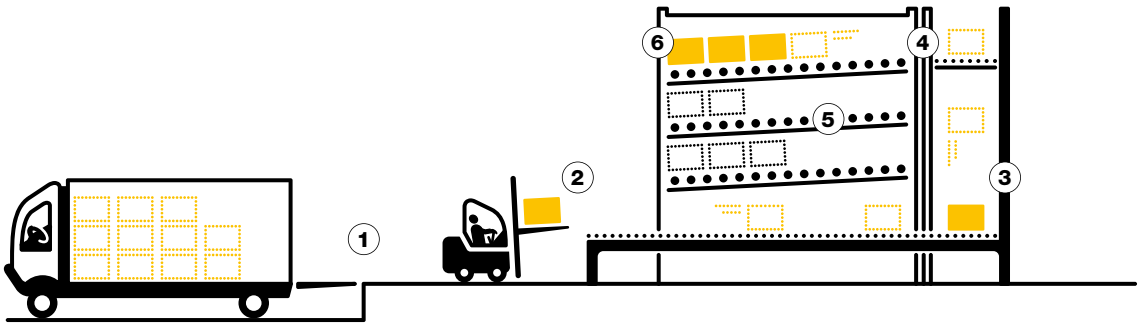
… the stacker crane, which automatically places them on the correct runway in the flow rack.

Breaking new ground

"We have several production facilities here," says Alexander Schröer, who heads Miavit's engineering department. "Preparation of products for our customers was done more or less manually. That was error-prone and we were starting to have space problems with our forklifts." Company management decided to build a logistics center. There they wanted to bring together the premixes from the different facilities and prepare them for customers as quickly as possible. At the heart of the new facility is an automated high-bay warehouse. "We checked out a few systems and then invited Bito Lagertechnik," recalls Schröer.

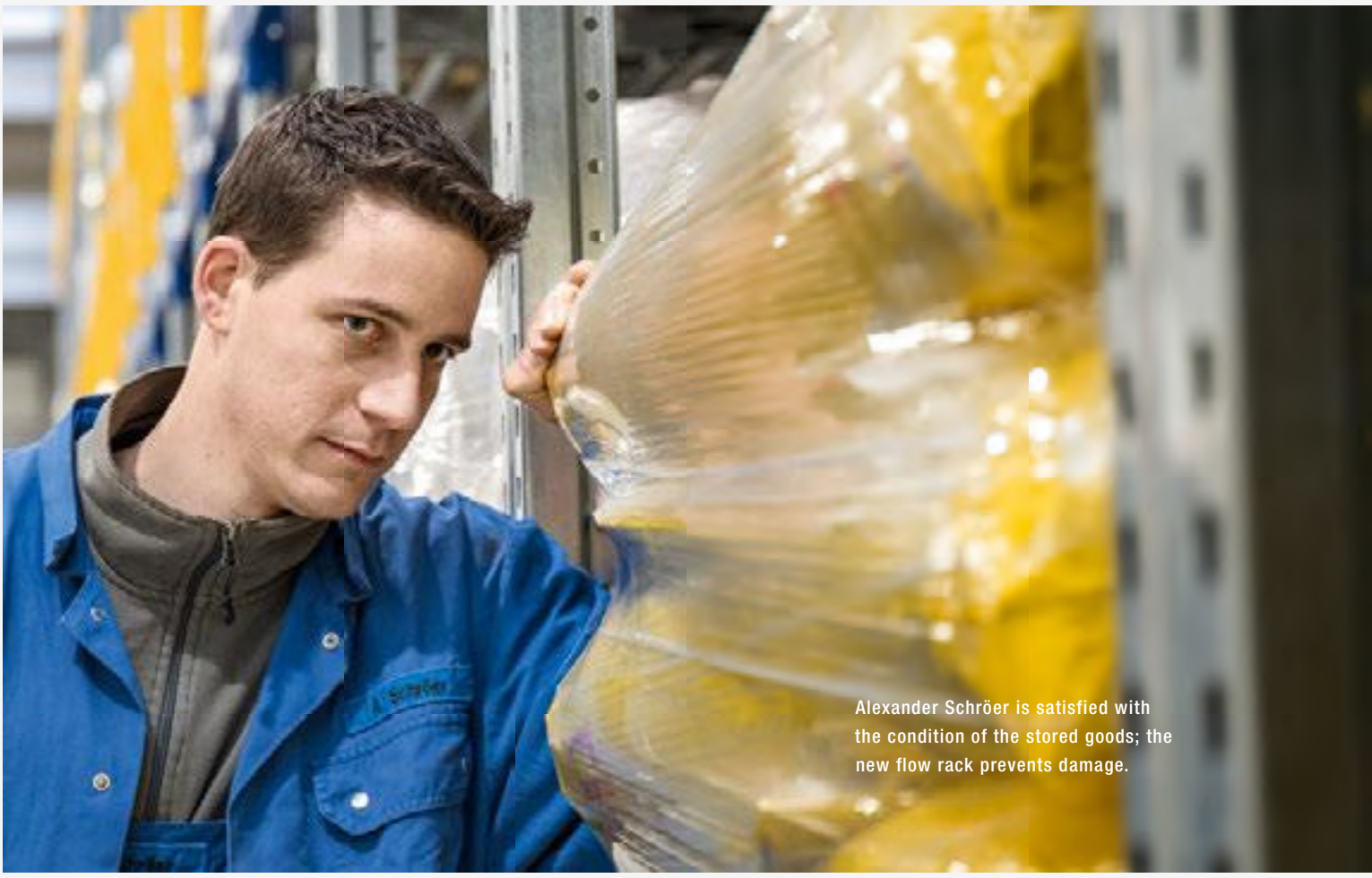
On October 14, 2014, Stephan Klotzke drove onto the grounds at Miavit with its ocher-colored factory buildings. He is Bito's area sales manager for the Bremen region and this was not his first visit. A few years before, he had installed a narrow-aisle rack there. But what Managing Director Lukas Middendorf presented to him on that day was in a different league and would also be something new for Bito. "After our first brainstorming session in a small group, there were still a few systems to choose from." But after five more sessions, it became clear that only a pallet flow rack would satisfy the company's requirements, which called for trouble-free trans-

How PROflow active works



The premixes are delivered from the production facilities and picked up by the customers on swap trailers (1). A forklift transports the delivered pallets to a conveyor (2), which scans their barcodes and checks their weight and condition. Then they are transported to the stacker crane (3) at the rear of the flow rack (4). The stacker crane automatically places them on the correct runway in the flow rack. There is a drive roller (5) for every pallet space on the runway, which has a two-percent incline. The drive rollers give the pallets a start assist or slow them when needed.

At the unloading side (6), they delay the following pallets by ten seconds so the forklift can safely remove a pallet.



Alexander Schröer is satisfied with the condition of the stored goods; the new flow rack prevents damage.

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port of different pallet types with many different kinds of packaging. "For sacks alone, we have very different bulk densities, from loose to jam-packed," says Schröer in describing the variety. Then he adds another important challenge: "Since we sometimes work with hazardous goods, for a height of over 7.50 meters we would have had to satisfy some very strict conditions including a very expensive sprinkler system."

Control instead of gravity

Bito's PROflow active convinced Miavit's management. In contrast to conventional flow racks with their four-percent inclines, it only needs two percent for its flow levels. So the three-level warehouse at Miavit only reaches a height of 7.50 meters. Its highlight: it doesn't work like most others by using gravity to move the pallets from the loading side to the unloading side along a runway. Instead it uses electric drives in its rollers. "This capability distinguishes it from the typical flow racks on the market, which work with gravity," says Alexander Lang, product manager at Bito, who has supported the PROflow active since its launch. "That was also something new for us."

Thanks to the start assist by the drives, the flow rack can deal with a wide range of packaging types. On runways that work with gravity, the pallets roll down on their own as soon as one is removed at the front. When they run into each other, forces are exerted. "Sometimes pallets will be overpacked," says Schröer. "Then the packaging protrudes over the edge of the pallet. A collision can damage the packaging and make the goods unusable." The drives in the PROflow active can keep the pallets separated as they move along the runway, avoiding unwanted contact.

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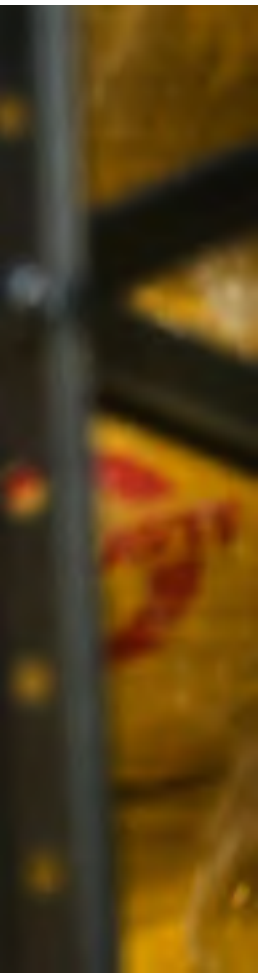
"The drive is what distinguishes PROflow active from typical flow racks on the market."

ALEXANDER LANG —— PRODUCT MANAGER AT BITO LAGERTECHNIK



Matthias Trenz explains the drive unit to Alexander Lang (right), product manager at Bito. Trenz is Market Manager Industrial Drive Technology at ebm-papst.

Jan Hosan

Jan Hosan

PROflow active enables trouble-free handling of all kinds of packaging and pallets.

The heart of the new logistics center is an automated high-bay warehouse

READ THE ARTICLE ABOUT THE DEVELOPMENT OF THE DRIVE SOLUTION AT:
mag.ebmpapst.com/bito

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For the start assist, Bito uses a drive solution jointly developed with ebm-papst. The system consists of a drive with integrated electronics and transmission and is delivered with wiring and fastening nuts. "That makes it extremely easy for us to install in the rollers," says Alexander Lang happily.

Fast throughput

Alexander Schröer also smiles as he walks along the three-level flow rack with its 30 rows, giving way to a forklift now and then. The entire system works without any aisles, operations only seem to take place on the unloading side. When goods arrive from the production facilities on a swap trailer, a forklift places them on a conveyor system, which automatically transfers them to a stacker crane that puts the pallets on the right runways. From there the pallets roll one after the other to the unloading side, where they are removed by forklifts. This allows considerably greater throughput than before, and enables more timely production.

Now Miavit moves about 500 pallets through the logistics center every day. "Only a few months after starting up the facility, we're already at 85 percent of capacity," says Schröer with furrowed brow: an expansion might be needed soon. ●

COMPANY
Audiodesksysteme Gläss GmbH

LOCATION
Königsbronn, Germany

“It starts with creative chaos”

Reiner Gläss makes music lovers happy worldwide with his LP record cleaner. In an interview, the inventor reveals how he works.

KD Busch

KD Busch

Creative thinker with reliable team: When tinkering, Reiner Gläss prefers to be alone. Once his plan is in place, his team gets to work.

M

Mr. Gläss, how does one come to develop a record cleaner?

It just kind of happened. When I started my own business 20 years ago, I knew that I didn't want to be a company employee my whole life. I've always been a very creative person, so first I built furniture for hi-fi systems. A lot of people thought that was great — but nobody bought any. Another milestone for me was the development of a yin-yang aroma lamp. Some retailers were interested in it, but then the audio industry got in the way. My advisor at the employment agency asked me one day if I could make him a machine that would bevel CDs. So I developed one. He was so excited that he recommended a hi-fi dealer for me to sell it to. He ordered three of them right away. And that's how I went into production with it. Parallel to that I offered a test unit to a hi-fi magazine. They published a report along with my phone number. From then on my phone was ringing off the hook.

How did you get from CDs to records?

A trade journal offered to present me at their stand at Europe's biggest trade fair for the hi-fi sector. I got more and more requests there to develop a system for washing records. I couldn't really see a market for that; it seemed like too much of a niche to me. But I got more and more calls asking if I was already working on something. So I announced on my website that I was developing a fully automatic record cleaning system for the analog fans, and I also informed the retailers and importers that I knew through the CD beveling machine. Now we serve 50 countries through established importers. The Vinyl Cleaner Pro is keeping us pretty busy.

What makes it special?

It's compact and it cleans both sides of a record at once. Most competing products don't do that. I was also the first to include

ultrasound. The Vinyl Cleaner Pro is very quiet, completely automatic and easy to use.

And who buys the Vinyl Cleaner Pro?

I target collectors and audiophiles; some of them have never warmed up to CDs. They're almost all men; some have their own music rooms. And their systems cost an average of 30,000 euros. It's an exciting clientele from every educational level.

How important is it to you as a developer to have a healthy sense of curiosity for such unusual products?

I'm always open to new things. Customers are always contacting me because they're looking for something special. And when the requests pile up, that's when I get to work. At the moment I'm in a slow phase. After all the stress, I really needed a break. You can feel it when the creative juices aren't flowing right anymore. But I'll develop something again. I can't just sit around, that's nothing for me. And I'll notice when something slowly begins to grow....

Do you tinker alone or in a team?

The creative process mostly happens alone. For me it works best when I have peace and quiet. If I run up against my limits, I'll go to my colleagues and we'll talk for a while. Then I'm alone again. Sometimes I'll describe an approach to the team and we'll talk about it. Then all the ideas are put on the table, no matter how crazy they are.

How does your path from a crazy idea to a series product look?

It usually starts with creative chaos, beginning with a very simple sketch that I implement in my tinkering phase. Then I look for suppliers. That brings structure into the process. Purchasing is a very important aspect. And then there are all the surrounding bureaucratic things that you have to take care of. Now I have an employee who helps me there.

On the subject of suppliers: the LPs are dried by waterproof diagonal fans from ebm-papst. Why did you choose these components?

Because they're very reliable. I tested other components, but none of them won me over. The Vinyl Cleaner Pro has to be quiet, and for that the fans are perfect. At first I had problems with the liquid. If somebody used too much cleaner, foam would form. The foam would get into the fan area and cause failures. So I started to take the fans apart and dip the electronics in synthetic resin to seal them. What a mess! Finally I contacted ebm-papst, who offered me completely sealed fans. Even under power in a bucket of water, they won't fail. That's really cool.

Now your record cleaner is being copied by Asian manufacturers. Are counterfeit products a problem for you?

No, they're no problem. I've bought a few and taken them apart. As far as quality, noise and functionality are concerned, they're a disaster. So no danger (laughs). I notice whether counterfeits get a foothold in the market, and I keep improving my product in the background. By the time they catch up, it's already obsolete. ●

FOR MORE PICTURES FROM REINER GLÄSS'S WORKSHOP, GO TO:
mag.ebmpapst.com/vinylcleaner

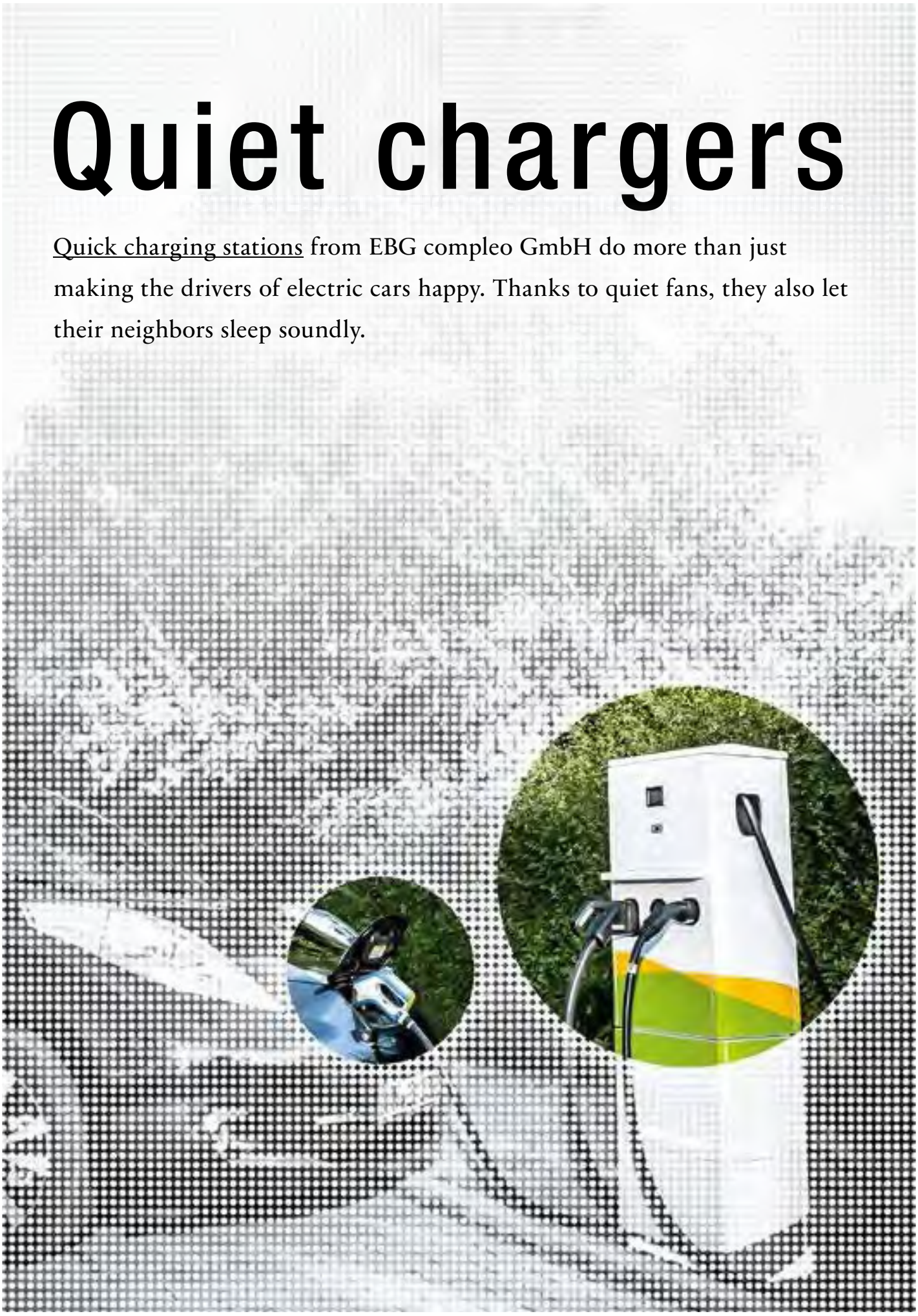
KD BUSCH

How the Vinyl Cleaner Pro works

The record is inserted vertically into the unit. A mixture of distilled water and cleaner is pumped into the cleaning chamber from below, covering the record to just below the label. The record turns through the liquid. Surplus water runs to the bottom and is filtered. Then an ultrasonic transducer starts and rollers contact the record from both sides and rotate in opposite directions. When the cleaning process is completed, the rollers are retracted, the liquid flows downward, and the record is dried by two fans.

Quiet chargers

Quick charging stations from EBG compleo GmbH do more than just making the drivers of electric cars happy. Thanks to quiet fans, they also let their neighbors sleep soundly.



EBG compleo GmbH

COMPANY
EBG compleo GmbH

LOCATION
Lünen, Germany

Before the internal combustion engine was invented, it looked like the electric motor had a great future to look forward to; the first cars were powered by electricity and not gasoline. But then Carl Benz presented his Benz Patent Moorwagen on January 29, 1886. Soon after that, the combustion engine was considered superior to the electric motor. The batteries simply didn't hold up long enough. In contrast, refilling with gasoline was fast and cheap.

But 130 years after Benz's patent, electromobility is on the rise. It is expected to contribute to meeting ambitious worldwide climate targets. To make sure that electric vehicles can take their place on the roads, they will need better batteries that can be recharged faster.

In Lünen, a city in the German state of North Rhine-Westphalia, Kai Schönenberg is looking forward to this development. He is the sales team leader at EBG compleo GmbH, responsible for selling charging stations — the gas stations of the future. "We introduced our first charging station in 2009. Now there are almost 6,000 of our charging points in use throughout Europe," says Schönenberg. Though it is still relatively new to the business, EBG compleo is now among the leaders in the sector. The company is a subsidiary of the EBG Group, which has been making distribution cabinets for over 60 years. The cabinets are designed for outdoor use and made of a special plastic that can withstand any weather. "In principle, charging stations are just outdoor power distributors. Since we already had the know-how, getting into this market seemed like the obvious thing to do," says Schönenberg.

From socket to quick charger

Besides the range of a charged battery, the time it takes charge one is the main obstacle for acceptance of electric cars. "The only way to charge used to be the household electric socket, which can only deliver up to 3.7 kilowatts. It could take half a day before the batteries were full," says Schönenberg. That's no way to fill up quickly. The new CITO DC quick charging station is closing in on this target. It can completely recharge an empty battery with a capacity of 25 kilowatt-hours in about half an hour. "In practice, drivers only charge as much as they actually need. Then five to ten minutes of charging time is enough for the next few kilometers."

But how does a charging station actually work? In the company parking lot, Schönenberg points to a plain, slender pillar. "Many people wonder how it's possible to pack so much performance into such a tight space," he says, pointing to an unobtrusive cable distribution cabinet about twenty meters away. "We've separated the interface unit from the power unit. Otherwise the operators would have to post huge boxes weighing up to 500 kilograms by the side of the road." Continuing with his demonstration, Schönenberg holds his customer card up to the charging station, pulls out the plug and inserts it into the socket in his company car. The charging process begins and Schönenberg walks over to the distribution cabinet. "When one or more vehicles are connected to the charging station, of course the power electronics generate a lot of heat that has to be dissipated efficiently. EBG compleo's technology uses air cooling to prevent overheating. Drivers need to be sure that the charging station will work. There's no gas can for an electric vehicle."

Quiet neighborhood

The challenge during development was to develop a cooling system that didn't need much space. So the engineers at EBG compleo chose two EC centrifugal fans from ebm-papst for their solution. "They're not only compact and very reliable, they're also extremely quiet. An important aspect since some charging stations are in residential areas," says Schönenberg. The CITO is much quieter than required by noise abatement regulations. The fans can also be controlled as needed and only run when they are actually needed for cooling. "Our customers like the charging stations," says Schönenberg and points to a couple of office containers. "We can't build fast enough to keep up with our growth." ●

The EBG Group

The company was founded in 1948 in Lünen, north of Dortmund. It specializes in the production of distribution cabinet housings. In 2009, the EBG Group entered the charging station business and founded EBG compleo GmbH for that purpose. The company develops and produces the charging stations and also offers service and maintenance packages. Customers include municipalities, electric utilities, car-sharing businesses and private companies such as banks.

COMPANY
Mercedes-AMG Petronas Motorsport

LOCATION
Brackley, GB

Cool Performance on the Pit Wall

Sat on the Pit Wall, five of the Mercedes-AMG Petronas Motorsport engineers must make decisions within seconds. Since last season, it has been made easier for them to keep their cool — thanks to an air conditioner with a blower from ebm-papst.

How are the drivers' lap times changing? Which settings are the best for the final phase of the race? Will the predicted temperature change have an impact on the course of the race? During every Grand Prix, the Engineers have to analyze and answer questions like these. Right on top of the action are the men seated on the Pit Wall. The relevant information is displayed on the large monitors in front of them. The team, communicates with their colleagues in the Garage and the Drivers on the track via radio. With over 150,000 possible scenarios relating to the further development of the race this is no easy task.

Air conditioning instead of cooling

Until the beginning of the 2016 season, a simple fan cooled both the technology and the engineers. Especially during races in hot places such as Malaysia, it was a real challenge for everyone involved. Since the minor details often make the difference between victory and defeat in Formula One™, Mercedes-AMG Petronas Motorsport decided to replace the simple fan on the Pit Wall with an air conditioner at the beginning of the 2016 season. The new system cools the sensitive electronics on the Pit Wall and creates more pleasant working conditions for the team members in front of the monitors. One air conditioning unit is located at each side of the Pit Wall. They guide the cooled air though a duct system. On the one hand, the air flows through the ducts to cool the electronics behind the monitors and on the other hand, 10 outlets direct it towards the Formula One™ Team's Engineers. Just like in the cars, the Pit Wall personnel use the outlets to determine how much fresh air they receive.

An easy choice

It was easy for Mercedes-AMG Petronas Motorsport to choose the fan supplier for the system, as a number of successful projects have already been realised with ebm-papst supplying the Team's air conditioning within the Garage and on-car cooling. As a result, a high-performance centrifugal blower with single inlets and forward-curved blades is working in each of the air conditioning units. For the Team, the fact that its Official Supplier was able to quickly supply the ideal fans for the application thanks to its wide product range was a major advantage. This facilitated the project's rapid realization.

The race engineers are also happy about the improved conditions. "With ebm-papst, we have created a pleasant working climate. This provides a clear advantage in the competitive racing environment at Grands Prix," said Toto Wolff, Head of Mercedes-Benz Motorsport. ●

Custom-tailored cooling: Using air outlets, the engineers can determine how much air flow they need at their working place.

FOR MORE INFORMATION ABOUT THIS TOPIC, GO TO:
f1.ebmpapst.com

Daimler AG, Mercedes-Benz Grand Prix Ltd., Gernot Walter

COMPANY
PROCADDIE

LOCATION
Prudhoe, GB

It makes a golfer's heart sing. And Christian Lang's heart too. As head of the B-project development group at ebm-papst Zeitlauf, he was involved in the development of the ProCaddie RX1 and also field-tested it.

FIND OUT HOW THE PROCADDIE RX1 WORKED IN A FIELD TEST, IN THE SHORT INTERVIEW WITH DEVELOPER CHRISTIAN LANG AT
mag.ebmpapst.com/procaddie

The golfer's favorite

With the self-driving ProCaddie RX1, the right iron is always at hand on the links — without any pulling, dragging and yanking.

It may not be able to change the weather, but otherwise the ProCaddie RX 1 makes golfers very happy. Now they can concentrate on their handicaps and always have the right club at the ready, because the electric golf trolley from ProCaddie, a British manufacturer, follows them smoothly all around the course and takes care of transporting their heavy gear.

Thanks to an optimized permanent magnet DC motor with Performax planetary gear system from ebm-papst Zeitlauf, it does the job reliably and, above all, is pleasantly quiet. "The RX 1 features a lightweight construction and modern design especially intended to attract young golfers," says Paul Prescod, who supervised the project in his capacity as Commercial Director at ebm-papst UK.

The elegant design also dictated the requirements for all other components such as the motor and the battery, which had to fit in the limited space provided by the housing. "And it needed to deliver top performance and speed without draining too much energy from the battery," says Prescod. The solution: an optimized motor winding and a speed increase from 3,000 to 5,000 rpm. That provided more power with optimum energy utilization.

With a fully charged lithium-ion battery pack, the ProCaddie RX 1 has no trouble accompanying a golfer to all 18 holes — in snow, rain, storm and sunshine. ●

Angelika Grossmann

COMPANY
Teensma

LOCATION
Almelo, Netherlands

Ralf Kreuels

Here come the sound guys

The team of engineering consultants from Teensma makes sure things are quiet wherever noise would disturb people, including residential areas with people who surf the Internet at high speed using fiber-optic connections.

G

Given that Peter van der Velde actually has nothing to do with ventilation and air conditioning, he has put a lot of thought into them in the last few years. As the managing director of the Dutch engineering firm Teensma, he and his staff of six usually work to keep people from being bothered by noise. Teensma insulates big industrial plants, improves acoustics in classrooms, or makes sure that electrical installations in residential areas don't disturb anybody with their humming. An example is the distributor stations for fiber-optic cables. They bring fast Internet access into the living room from the higher-level networks. The stations naturally have to be as close as possible to the users, but they shouldn't make any noise. And this is where the air needed for cooling comes into play, the air that van der Velde has thought about so much lately.

Cooling with outside air

"Normal air conditioners are usually used to cool distributor stations in residential areas, but they're often relatively loud and bother the neighbors. When we were tasked with making such a station quieter, first we developed insulation for the existing installation. The result was a system that was quieter, but expensive to operate and so complex that only specially qualified technicians could work on it. Since we as engineers prefer to think things through from the beginning rather than from the end, we set ourselves the goal of significantly reducing noise at the source while also making the system design much simpler."

Small team, big job: The staff at Teensma make distributor stations for fast Internet in residential areas quieter.

"The data from ebm-papst are exact. That sounds trivial, but it's not something you can take for granted."

PETER VAN DER VELDE —— MANAGING DIRECTOR OF TEENSMA

So the team began work on a ventilation system that would cool the equipment in the distributor station using only outside air. This method had not yet been implemented successfully in such distributor stations and was viewed by many as insufficiently reliable. Van der Velde and his team worked mainly on the control system and the right filters for the ventilation system; moisture and particles must not be allowed to harm the sensitive equipment. The engineers from Teensma were also very careful in their choice of fans, as van der Velde recalls: "From the beginning, we had ebm-papst and a competitor in mind for the required EC fans. We ordered products from both companies and tested them precisely in various installation scenarios. The results were clearly in favor of ebm-papst. On average, its fans were four to five decibels quieter than the ones from its competitor. And the information in the data sheets about air flow, pressure and noise level matched reality exactly. That may sound kind of trivial, but it's definitely not something you can take for granted with a lot of manufacturers. Sometimes they're a bit more optimistic with their values."

80 percent less energy

The first prototype with ebm-papst fans confirmed the engineers' assumption that fresh-air cooling with EC fans would result in a bundle of benefits. Just a few steps away from the distributor station, people no longer perceive its noise as disturbing. Due to their higher efficiency, the fans also give off less heat into the station's interior and reduce its energy consumption drastically. The distributor station with fresh-air cooling uses 80 percent less energy than its predecessor with a conventional air conditioner. Beyond that, van der Velde can cite other advantages: "Ventilating with fresh air is very simple. Maintenance staff need no special qualifications. We can tell them everything they need to know in just a few hours. The system has fewer components, so it's less likely to have malfunctions. Our product has been on the market for three years and there were only two malfunctions in that time, and they had nothing to do the fans. Another plus is controllability. They can be adjusted to the exact output needed for the season and the temperature."

Faster streaming

Teensma has sold over 300 distributor stations to the Dutch fiber-optic network operator Reggefiber, and the German operator Deutsche Glasfaser has bought over 100 stations. The product from the small Dutch engineering firm does its part in many areas to give people fast streaming, games and shopping without having a humming box in front of their houses. Van der Velde is optimistic about the future, saying "I see lots of potential for our distributor stations in the coming years. Fast Internet is often taken for granted in big cities, but there's still a lot to be done in rural areas. With our quiet and simple systems, we make it easier to expand the networks, especially in such regions." ●

How the stations are cooled

Teensma packs all of a station's equipment into a structure made of concrete, which makes climate control easier due to its delayed heat absorption and dissipation. Teensma sells stations in two sizes. Depending on their purpose, they can be as large as a garage or a small shed. The smaller units can supply several hundred households with a fiber-optic connection; the larger ones can supply over 2,000.

To cool the electronics in a station, RadiCal EC fans suck in cool outside air and convey it into the station under the floor. From there it flows into the room through a fine grill and cools the electronics as it flows by. The resulting warm air then flows beneath the ceiling and back to the outside. Since the EC fans can be smoothly adjusted, the temperature in the distributor stations remains below the standard operating temperature of the electronics regardless of the season and the ambient temperature.

Ralf Kreuels, Gernot Walter

COMPANY
ISI Industrieprodukte GmbH

LOCATION
Buchholz/Mendt, Germany

Sucking it away

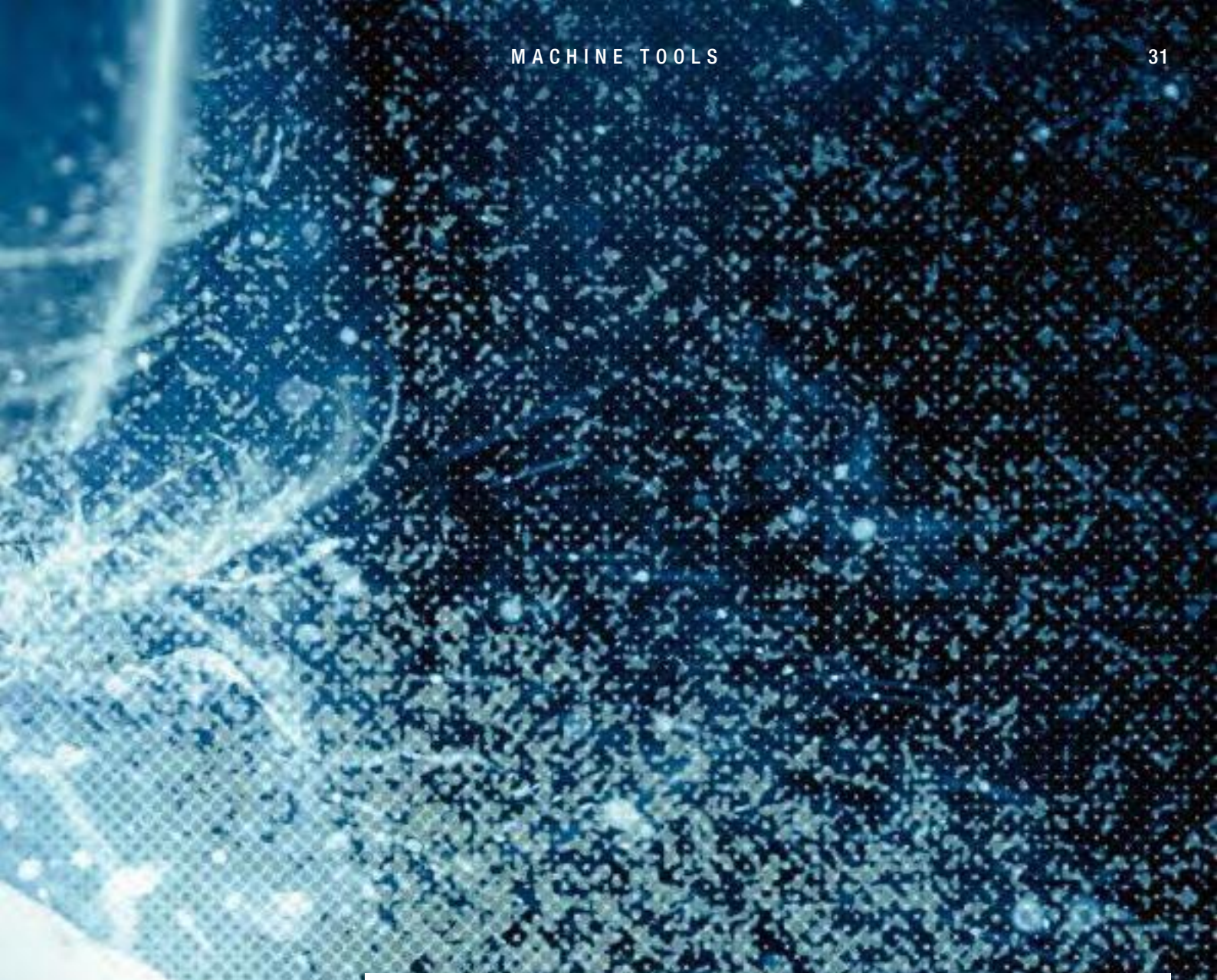
Air cleaners from ISI Industrieprodukte GmbH keep the air pure around machining centers.

The chips fly when modern machine tools are at work, and the cooling lubricants they use are a source of aerosols, oil mist and vapors that can endanger the health of the employees who work with them. To keep that from happening, machine tools have air filters that safely extract emissions and suspended particulate matter to protect the health of the people around them. A leading manufacturer of such filter units is ISI Industrieprodukte GmbH from the town of Buchholz in the German state of Rhineland-Palatinate. The company has made a name for itself over the decades while steadily improving its products. Like the rest of the sector, in 2013 its management faced the challenge of designing its filter systems to conform with the newly introduced ErP Directive.

Improving instead of merely adjusting

The simplest approach seemed obvious enough, as Guido Vostell, sales manager at ISI Vertriebs GmbH, recalls: "At first we simply wanted to replace the existing AC blowers in our filters with more efficient blowers — like our competitors. But while searching for suitable products, we came across ebm-papst and realized that this forced modification was a big opportunity for us if we actively shaped it instead of just trying to do the minimum to satisfy the standard." So ISI found out more about EC fans. They not only promised energy consumption considerably below the usual levels, but also offered other attractive advantages for ISI. "We noticed quickly that we could implement nearly all of the extra benefits offered by the EC fans from ebm-papst as benefits in our product," says Vostell.

The first positive effect already showed in the redesign of the air filters. Since the newly installed EC fans are very compact, ISI was able to make the entire air filter smaller, saving space in the machines in which the final product is used. Another big benefit that the EC fans can realize in the air filters is their precise controllability through their entire speed range. Vostell explains how his customers benefit: "Especially big OEMs who install our air filters can now integrate fan control completely in their machine control systems. Then the air filter adjusts its air



performance automatically to the step currently being performed by the machine. If more pollutants are being generated, it sucks harder; when the machine is not working so hard, fewer pollutants arise and the filter runs more slowly. That wouldn't have worked so easily with AC fans." This controllability also means a longer service life for the installed filters since they don't have to work with maximum filter surface loading when it isn't needed.

Energy costs cut in half

Since the aim of the new generation of air filters was compliance with stricter guidelines, the high efficiency of the fans naturally played the biggest role. On average, the energy costs for the air filters with EC fans are more than 50 percent lower than those of their predecessors. "For just one machine, that's a difference of several hundred euros per year," says Vostell. "When an entire building is full of machines, it really pays off." The savings are so high because the power consumption is approximately proportional to the cube of the speed. That means that half the speed means only about an eighth of the power consumption. The energy savings become especially noticeable in partial-load operation since the efficiency of the EC motors remains at a high level. A pleasant side effect of the high efficiency is that the fans bring little extra heat into the building and make work there more tolerable in the summer. During all seasons, the low noise emission of the EC fans is noticeable. And thanks to their smooth operation, they cause significantly fewer vibrations than conventional fans. That's especially important for precision machines that need to work as free as possible from negative external effects.

Today ISI uses EC fans from ebm-papst in almost all of its air filter designs. "The details of the application don't really matter; the EC products show their advantages everywhere," says Vostell. "And we're ready for the future with them because we still haven't maximized the possibilities for increased efficiency offered by controllability combined with sensors. We see more potential there to make even better products for our customers." ●

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Febrava, *Sao Paulo, 12 – 15 September 2017*

IAA Pkw, *Frankfurt, 14 – 24 September 2017*

Mostra Convegno, *Singapore, 13 – 15 September 2017*

Host, *Milan, 20. – 24 October 2017*

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$$\vec{\omega} = \vec{\nabla} \times \vec{v}$$

Vorticity is a crucial quantity for an axial fan's acoustic properties.

A velocity field's rotation is given by the cross product of the directional derivative vector ($\vec{\nabla}$) and the velocity vector ($\vec{v}$). It specifies how fast or how strongly a vortex in a flow field is rotating around its center. The vorticity can be influenced by making changes in the blade geometry near the gap between the fan and its housing. Noise increases with increasing vorticity.

For axial fans, the pressure difference between the intake and outlet sides results in a flow over the fan blades in the vicinity of the housing wall. The flow interacts there with the edges, the blade surface and the surrounding housing wall. Vortices form which can raise the noise level by up to 10 dB.

The gap between the blade tip and the fan housing has a major impact on the noise level, with the noise decreasing as the size of the gap is reduced.

This is where winglets can help. With these specially designed geometric deformations at the blade tips, the tip gap flow and the vortices arising there can be influenced in a way that significantly reduces noise for a given gap size.

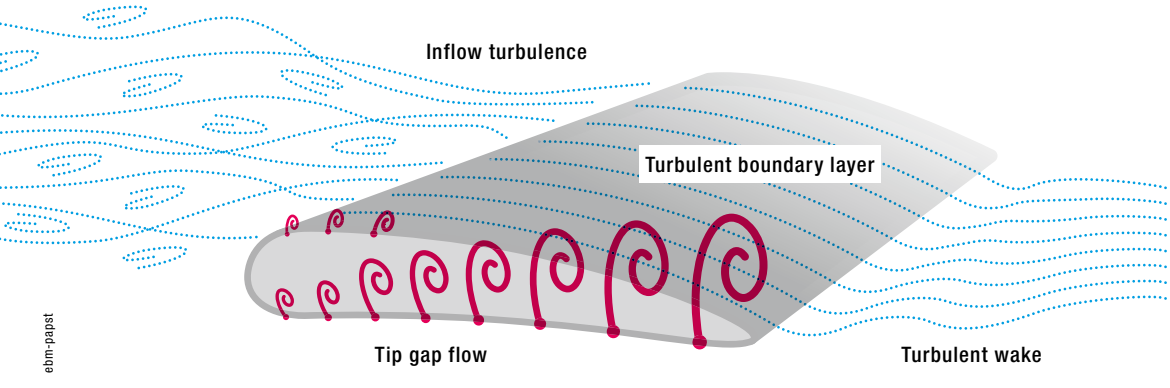
Winglets can influence the vortices with different geometries. One possibility is to reduce the velocity vector $\vec{v}$ of the vortices. So-called T-winglets increase the flow resistance in the gap area, thus reducing the vorticity ($\vec{\omega} = \vec{\nabla} \times \vec{v}$) and consequently the noise generated when the vortices strike solid surfaces.

The other possibility is to reduce the vorticity $\vec{\omega}$ by changing the blade contours: The blade is rounded off in the gap area and the edges over which the gap flow streams are removed — similar to the winglets on airplane wings. These blades only have an edge on the outlet side of the gap flow, so vortex formation is significantly reduced — this influences the gradient vector (del operator $\vec{\nabla} = \partial/\partial x, \partial/\partial y, \partial/\partial z$) = directional derivative vector).

Oliver Haaf, Group Leader in Prototype and Function Development for Aerodynamics at ebm-papst in Mulfingen

The winglet geometry that is best suited to a particular axial fan is determined by the required separation between the rotating (blade) and stationary (fan housing) components.

The interaction of the two components is crucial and the geometries have to fit in order to achieve optimal results. A good example is provided by the AxiBlade axial fans made of strong, glass-fiber reinforced plastic that enables the winglet shape to be adapted to the interaction with the newly developed housing geometry, reducing the noise generated at the gap. ●



The flow interacts in the vicinity of the tip gap with the neighboring edges, the blade surface and the surrounding housing wall. The strength of the resulting tip gap vortex depends on the design.

ebm-papst

Digital think tank

Delivering smart heating solutions is the goal for the new ebm-papst development center in Osnabrück, the fourth-largest city in the German state of Lower Saxony. About a dozen experts there will soon be experimenting with electronic combustion control.

It's over six hours by car from the ebm-papst heating competence center in Landshut and the new location in Lower Saxony. It was chosen for a good reason: It's close to many big customers and has good infrastructure and access to young talent such as students from the Osnabrück University of Applied Sciences, which conducts research in electronics and drive engineering. And if there's a need to consult with our Dutch subsidiary ebm-papst Heating Systems, that's not far away.

Heads of the development center: Hans-Joachim Klink, Head of Platform Development in Landshut, Stephan Wald, Head of Development for Heating in Osnabrück, and Stefan Brandl, Managing Director in Landshut and Chairman of the Board of Directors of the ebm-papst Group since January 2017

Stephan Wald, head of development at the new facility, is new at ebm-papst but has a lot of experience in the heating sector. He spent many years with a well-known producer of combustion controllers and gas valves, where he was responsible for developing a variety of innovative heating product lines. In his new position, Wald finds the team's mix appealing: young talent and experienced developers working together to break new ground.

Though there are already electronic and self-calibrating systems on the market, there is still plenty of room for efficiency improvements. The components from Landshut and Osnabrück offer outstanding synergies for advancements in combustion technology. Wald sees an important benefit here: "Free from old ballast and with a wide range of expertise in combustion, electronics, and blower and valve technology, we have a unique opportunity here to find new answers and take this market in new directions."

Paradigm shift in energy efficiency

Wald compares the move from pneumatic control to electronic gas-air composite systems with the transition from carburetors to electronic injection in combustion engines. Following the system change, there were continuous efficiency improvements in the electronically controlled engines. Since the opening of the world's gas markets and the wide range of gas quality and composition that became available as a result, there are many good reasons for smart electronic combustion control that ensures low-emission combustion and optimum energy use. Stephan Wald and his team are on their way. ●

With his team, Stephan Wald researches new, integrated solutions for the heating sector.

Christa Henke

Testing in China

ebm-papst has had its own test center in China since 2012. It helps local customers produce better products.

Air cleaners hum away in millions of Chinese households, filtering out tiny pollutant particles blown into the air by China's booming industries. One Chinese company's air cleaner does the job with particular efficiency, circulating up to 750 cubic meters of air per hour so quietly that its owners can sleep soundly at night. Not only a fan from ebm-papst makes that possible, so does a sophisticated design for the air flow. "For this machine, we worked very closely with the manufacturer — not only finding the right fan but also making design recommendations so that the customer can get the most out of our product," says Henry Cheng, Vice President of Sales and Marketing at ebm-papst in China.

The engineers in China simulated the ideal air flow in a lab and the acoustic performance in a special acoustic chamber. Just a couple of years ago that wouldn't have been so simple. Before the site in Shanghai got its own test center in 2012, the Chinese engineers couldn't perform such measurements on their own. "Before that we either had the tests done at ebm-papst in Germany or commissioned external labs to perform them. But with Germany it took a lot of time — also because of language barriers — and with the labs the equipment didn't exactly satisfy our requirements," says Cheng. The engineers in the test lab were able to test many other factors in addition to air flow and acoustics. "We invest in new test equipment every year," says Cheng.

The ebm-papst subsidiary in Shanghai has been growing ever since it was founded in 1996. At first the location served only as a sales center for the products from Germany and was staffed with 13 employees. Soon the site got its own production facilities, and then a research and development department and the test center in 2012. Today more than 1,700 employees work in China. "Now we can react to the needs of the local market much better," says Cheng, adding "With the test lab, we're basically part of the customer's development team. We can demonstrate our tests for them live on-site and make our recommendations. We want our customers to be able to make great products." Like the air cleaner, for which the manufacturer has won a prize for its special design. ●

WITH PROFILE

The new RadiPac: simple logistics, space-saving design and quick installation for applications in the field of ventilation. It's made possible by the integrated approach in which this centrifugal fan unites an EC motor and control electronics in a complete plug & play system — all with just a single part number. And that the RadiPac with its Airfoil impeller comes with a further efficiency increase and a lower noise level goes pretty much without saying.

www.ebmpapst.com/radipac

PLATFORM STARTER

For combination heating systems, the ability to cover a wide range of heating outputs is in demand, in order to provide enough hot water at short notice, for example. The VG 100 gas blower for condensing units delivers the necessary performance with maximum energy efficiency, low noise emissions and compact dimensions. It's also the first component in a new, modular platform.

www.ebmpapst.com/vg100

POWERFUL PIGGYBACK

For compact, high-performance machines, a single fan is sometimes not enough to keep all of the interior components supplied with cool air. Now there's a counterrotating team for that purpose: two individual fans joined together and rotating in opposite directions so that the rear fan can convert the residual swirl from the front fan into air flow with particular efficiency. With an operating noise reduction of 4 dB(A), the powerful duo reaches an air flow of 1,145 m³/h and a back pressure of up to 1,858 Pa.

www.ebmpapst.com/cr6300n

»Strong in mobile applications«

Who should be interested in the new ECI 80 motor? Patrick Schumacher, head of product management in the Industrial Drive Technology business unit at ebm-papst, explains.

Why did ebm-papst develop the new ECI motor?

Motors with so-called safety extra-low voltage up to 60 volts are becoming more and more popular in industry since they're easy to work with and to integrate electrically for several reasons. But limiting the voltage to 60 volts confronts us with a physical limit affecting motor power because of the high currents. Our idea was to develop a motor that comes very close to this limit, one that delivers high power even at low voltage. And we did it. The ECI 80 reaches an impressive output of 750 watts, more than twice as high as its currently available little brother, the ECI 63.

And who needs this kind of powerful motor?

The ECI 80 is particularly well suited as an industrial drive solution for automation and medical equipment. During its development, we had an eye on two fields of application in particular: intralogistics and medical equipment for hospitals. More and more often, drives in high-bay warehouses or driverless transport systems, shuttles and cross-belt sorters in factories are supplied with power by a battery. Here the ECI 80 can improve applications by making the most of its high power at low DC voltages. The same is true for mobile medical devices such as movable X-ray machines. For operating tables, it can perform tasks that used to be reserved for hydraulics. That lowers costs for the technical infrastructure in operating rooms considerably.

What other specific benefits do customers get?

The ECI 80 is extremely compact. While developing it, we made a special effort to ensure that the motor wouldn't induce any vibrations in the individual frequency bands while accelerating. So the drive works very quietly. With a few refinements in the motor design, such as optimized air gaps, and by using high-quality neodymium in the magnets, we were able to considerably improve its dynamic behavior. For short periods, it can deliver more than triple the rated torque.

Don't customers usually want a complete drive axle and not just the motor alone?

That's why we strictly adhered to our modular design concept during planning. ebm-papst also offers matching transmissions, encoders, brakes and controllers and other components for the ECI 80. Now, with Industry 4.0 in mind, we're working on integrated drive controllers and bus interfaces. ●

YOU CAN FIND MORE PRODUCT INFORMATION ABOUT THE ECI 80 AT:
ebmpapst.com/eci80

5.5
newton-meters

of starting torque show
its high overload capacity.

Psst!

The ECI 80 is extra-quiet.

750
watts of output

at a supply voltage
of only 48 volts.

Rugged

The ball bearing system is designed
for a long service life.

Neodymium

An optimized motor design and high-quality magnets made with
neodymium ensure strong performance.

Gernot Walter


WOULD YOU HAVE RECOGNIZED IT? —— THE NEW ECI 80 INTERNAL ROTOR MOTOR IS AT ITS BEST IN MOBILE APPLICATIONS. TAKE A LOOK INSIDE
50043-7-8811 PM-EN mag 01/2017
Gernot Walter