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mag

A house with an outlook

Intergas heats its way to the future with hydrogen.

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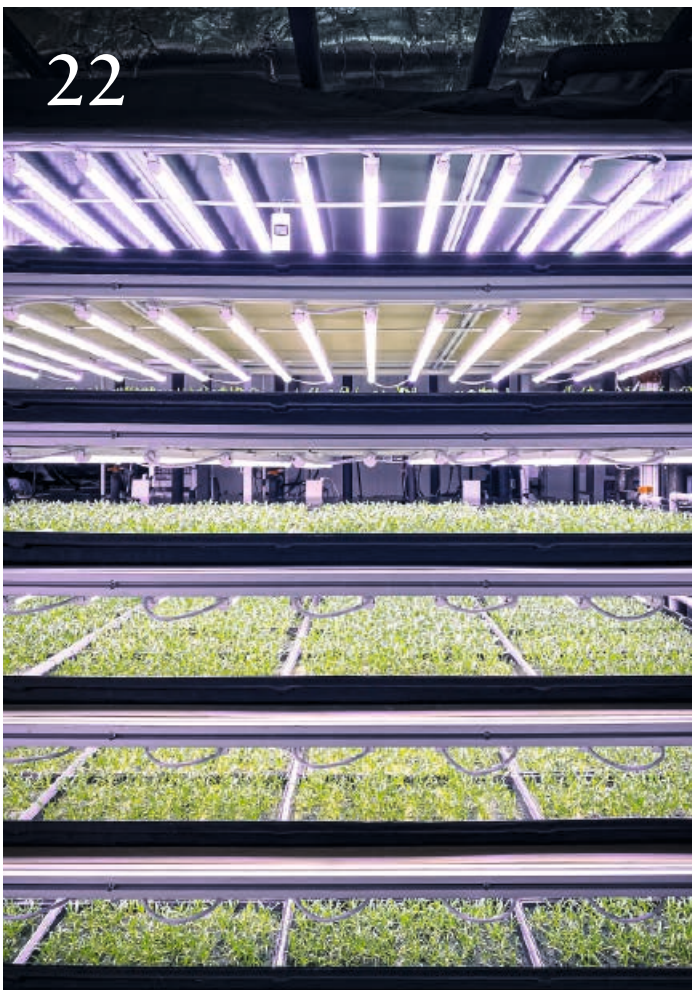

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Cover: Miquel Gonzalez | Fotogloria; Page 2 (clockwise): Miquel Gonzalez | Fotogloria; Gernot Walter; Artisan Green

Dear readers,

In the cover story of this issue of our customer magazine, the future is already very close: a tiny house that is heated and supplied with hot water using hydrogen. These are the sort of sustainable applications in which our innovative solutions can truly shine. In this story, they are doing so in the field of synthetic gases, an area that we cover with our condensing technology portfolio and where we are on the path to potentially using 100 percent hydrogen.

As the market leader in ventilation and drive technology solutions, we want to set a clear trend towards greater energy efficiency and resource conservation. Sustainability is anchored in our DNA, which is why we see ourselves as a pioneer in this area, a role that we will be assuming even more in the future. That is why we are also continuing to drive the switch from AC to EC technology forward. After all, more efficient solutions are absolutely essential to comply with ambitious climate goals. CEO Dr. Klaus Geißdörfer underlines this in his interview on page 9.

In order to continue our growth trajectory in the long term and to work with you globally to find the right solutions, we are investing heavily in our global capacity. In this way, we are constantly implementing our local-for-local approach, which is also how we are building on regional supply chains that make us less affected by disruptions, for example in the global supply chain. After all, our aim everywhere is: Engineering a better life!

Thomas Nürnberger

MANAGING DIRECTOR
SALES AND MARKETING
EBM-PAPST GROUP

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AxiRev: the new standard for decentralized residential ventilation

In the west of Russia, a modern wind power plant has begun shaping the landscape. Twenty-six wind turbines now supply 90 megawatts of sustainable electricity every year. **ROSENERGOTRANS** transformers convert the wind energy. Six centrifugal blowers per wind turbine help the transformers inside the turbines to emit their excess heat outside. Using blowers increases the output of the transformers by 12 percent. Thanks to specially developed corrosion protection, the salty coast mist cannot harm them either. Go like the wind! By 2024, the plan is to build two more wind farms with an output of 270 megawatts—all with centrifugal blowers on board. *Read the whole story at mag.ebmpapst.com/gamesa*

Siemens Gamesa

The retrofit at **CHANGI AIRPORT** in Singapore has achieved impressive results, including, on average, 25 percent energy savings and an air performance increase of over 15 percent. Large, old AC fans in nine ventilation systems were replaced with 44 new ones with EC technology. The modular FanGrid design allowed a high level of flexibility and reliability. Travelers and staff also benefit from the upgrade: the EC fans operate quietly and with minimal vibration. *Read the whole story at mag.ebmpapst.com/changi*


Skytrain to T1 & T2
往T1及T2 轻轨列车
Ke - T1 & T2
ターミナル1 2 行き
Cash Machine
(ATM)
自动提款机
Mesin Wang
現金自動預け払い機
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Check In

Jino Lee

No bending, no problems

The company ErgoPack makes life easier for logistics workers: ErgoPack Air puts an end to bending when strapping pallets. Instead of having to manually guide the strap under the pallet four times as before, all the staff have to do is press a button on the device. A chain lance pushes itself under the pallet, guides the belt upwards and hands it back to the operator. EtaCrown angular gearboxes from ebm-papst reliably transfer motor power in the ErgoPack Air. The crown gearboxes not only have outstanding efficiency, they are also robust and durable. This takes the load off the back of shipment staff, long term. ●

Read the entire story at:
mag.ebmpapst.com/ergopack

»We need to become climate neutral faster«

Pandemic, supply bottlenecks, climate change: Dr. Klaus Geißdörfer is facing major challenges at the start of his role as CEO of ebm-papst. He tells us in an interview how he is dealing with these issues and what he has planned for the company and customers.

Stands for sustainable solutions: Dr. Klaus Geißdörfer

Who is Dr. Klaus Geißdörfer?

Well, I actually originally come from the region, so working here feels like coming home. My passions are technology and sports. ebm-papst covers both as a technology-driven company that is committed to keeping its employees fit, for example with the company marathon. And I am also always looking for constant improvements when it comes to the values of humanity and enthusiasm.

And what can customers expect from you?

My motto is: We are here to create added value for our customers. For example, using efficient solutions that enable customers to achieve their climate targets more quickly.

These times are particularly challenging, with the pandemic, component shortages, and climate change. Which of these topics is currently the most important to you?

We cannot see the topics as being separate issues. The pandemic has led to the supply bottlenecks. These are occupying me most at the moment. A task force led by our CTO Dr. Stefan Arnold is bringing together all of the necessary measures in a holistic approach. We want to return to a normal delivery situation quickly.

What do you focus on besides the most pressing issues?

From my background, it is clear that digitalization and artificial intelligence are close to my heart. But digitalization is not just for digitalization's sake but rather is there to create added value—for our customers, for their customers, and for us. Sustainability is a major strategic issue, and luckily it's a part of our DNA.

Where do you see the greatest potential for driving the topic even further forward?

In two areas in particular: firstly with our products and the sustainable added value that they can create for customers through efficiency and resource-conserving materials. Secondly, when it comes to us as a company minimizing our CO_2-footprint. We have to do that faster. I want to build the future together with our customers to accelerate the issue of climate neutrality.

Are you also thinking about partnerships with customers in this area?

Yes, for example when exchanging data. I am convinced that we will be able to create even more efficient products by exchanging operating data more intensively.

At the same time, strategic partnerships are required, for example, when it comes to which platforms we use to work together to advance the energy efficiency of buildings as a whole. Setting up these partnerships will be a topic in the coming years. ●

Christof Wolf | ebm-papst

COMPANY
Intergas Verwarming B.V.

LOCATION
Coevorden, Netherlands

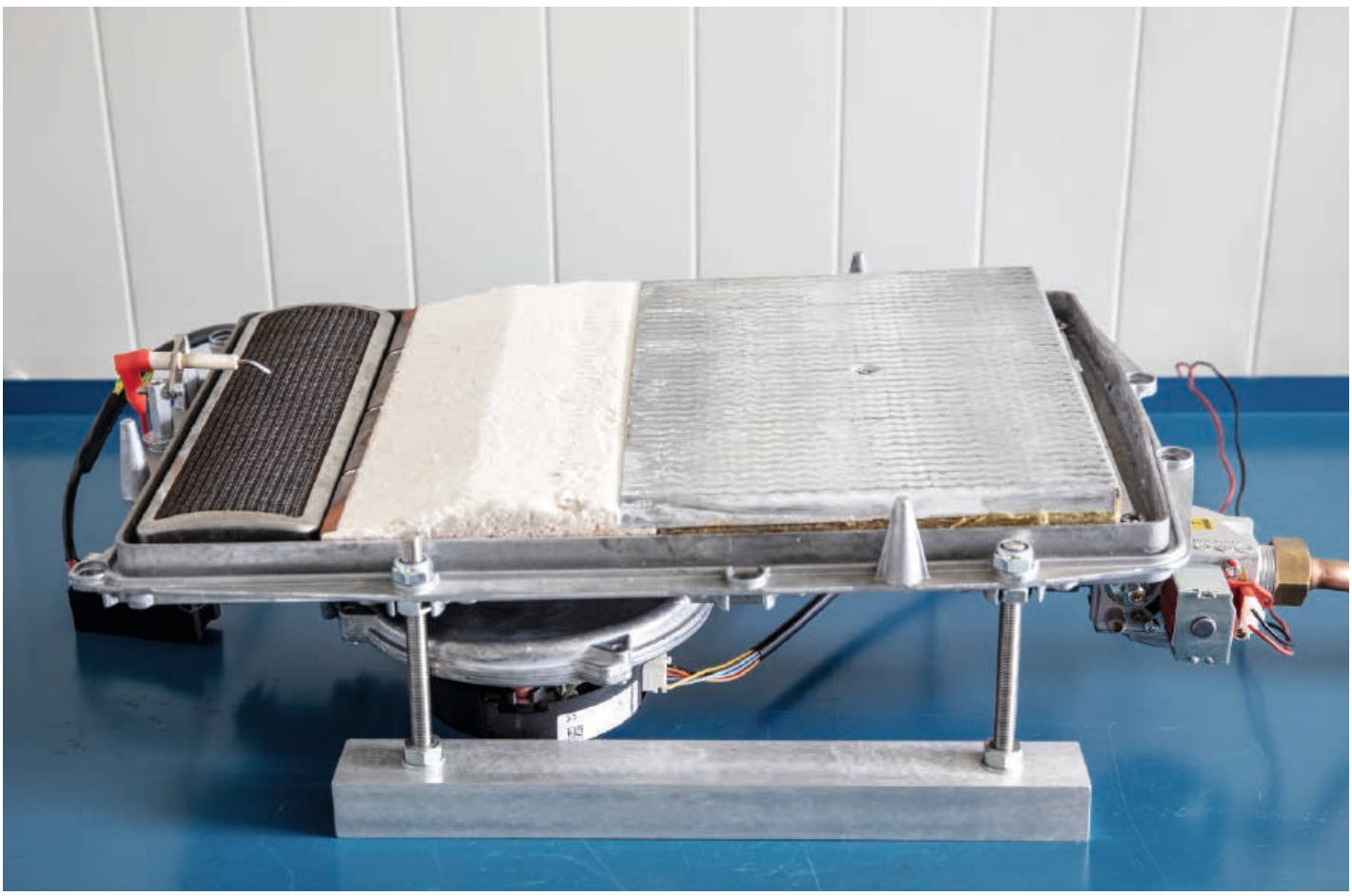
Heating with H_2

For outsiders, this is a tiny house. For industry, it is an outlook towards the future: in a demo test, the Dutch boiler manufacturer Intergas showcases how it generates cozy warmth from hydrogen.

Mikaela González | Fotogloria

TOP: For Intergas developer Gerrit Zijlstra (left) and CTO Peter Cool, their hydrogen boiler is a milestone in the energy transformation.

BOTTOM: Hydrogen behaves completely differently to natural gas. Therefore, basic research on an open burner was necessary.



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"Exciting!" When Gerrit Zijlstra talks about the tiny house, he get's excited. It is not even the cube's modern coziness, measuring 3.45 by 11.95 meters, that makes the physicist light up. In fact, the reason he is so excited cannot even be seen. Instead, it is something that is felt: despite the Netherlands' winter winds, the tiny house has a cozy temperature and the water in the house heats up quickly, allowing for a pleasant hot shower to warm you up. This is a milestone for Zijlstra and his employer, Dutch boiler manufacturer Intergas, based in Coevorden. This is because their boiler in the tiny house provides hot water and warmth, heating entirely with hydrogen.

"For me, this is what is fascinating about the tiny house project: integrating new hydrogen technology into a tried-and-tested product like a boiler and finding a solution for sustainable fuel. This enables us to reduce CO_2 emissions," says Zijlstra. Two years ago, Intergas embarked on this path. Because, as CTO Peter Cool says: "Hydrogen is both: storage and energy, which makes it an effective solution for the energy transition. Therefore we explore this as a solution." Developer Zijlstra took on the H_2 capability of Intergas' products as project manager for hydrogen. The first question to ask was, "How can we convert an existing boiler so that it can burn pure hydrogen?"

Laboratory tests

The search for answers began in the company's own hydrogen laboratory. First of all, that meant going back to the basic principles of combustion technology. After all, hydrogen behaves completely differently to natural gas, which is going to be replaced as part of the energy transformation in the not-too-distant future. Zijlstra explains, "With natural gas, we use its conductivity to monitor the flame. In contrast, a hydrogen flame is not conductive and is almost invisible. So first of all, we had to find a solution to ensure flame monitoring."

With a wide range of test setups and open burners, Zijlstra got to work at the laboratory, with the major advantage that Intergas has short chains of command between the disciplines required for an advanced boiler: "The hydrogen boiler is the result of an innovative collaboration with a fantastic team of specialists who excel in electronics, physics, embedded software, engineering, certification, IT, product management, and marketing," says Zijlstra.

Close links

There are close links beyond the company and national borders too. "We brought ebm-papst on board at the start of our work on the H_2 boiler. After all, we suspected early on that the gas valve and the blower would play a crucial role. We already had very good contact with ebm-papst through Enno Vrolijk, the head of gas valve development." In Enno Vrolijk, Jürgen Schwalme, head of application and certification, the applicator Christoph Beck, and Ludwig Hirsch, head of the test workshop, Intergas found contact persons who can provide both technical support as well as help with all necessary formalities. "We had a lot of interesting discussions and identified potential risks together.

Hot water on the march with hydrogen: The Waterstof Tiny House was on tour through the Netherlands as an ambassador for green heating.

ebm-papst also provided us with prototypes that are tailored to the characteristics of hydrogen," says Zijlstra. These include, for example, a particularly tight gas blower and special hydrogen settings for gas valves. However, it also had to be ensured that no sparks from electrostatic charging occur inside the blower even if there's a fault. The fact that ebm-papst has been dealing with the element H_2 for some time quickly paid off for Intergas.

Getting to work

"As heating experts we are all about development, development, development," says Zijlstra. So when they got an exciting inqiry their motivation was boosted even further: various institutions of the community of Hoogeveen had come together to build a small mobile house made entirely of sustainable materials, and operated with green hydrogen. In September

Miquel Gonzalez | Fotogloria

> **“The hydrogen boiler is the result of an innovative collaboration with a fantastic team of experts.”**
>
> GERRIT ZIJLSTRA —— DEVELOPER AT INTERGAS

In Enno Vroljik (left) and Jürgen Schwalme from ebm-papst, Intergas found contacts who have been working on hydrogen for a long time.

2021, the “Waterstof Tiny House” was set to go on tour through the Dutch region of Drenthe as an ambassador for green living and to inspire the wider population, students, and those with a professional interest. This was the ideal demonstration test for Intergas and its first H_2 boiler. However, by then, it was March already, so there was limited time.

“A major challenge for us was that the technology is further along than the regulations. We were unable to use certified components because there simply weren’t any certifications,” says Zijlstra. “But ebm-papst helped us in the certification process that we had to undergo for the tiny house demonstration test.” Expert Jürgen Schwalme explains: “Even before the tiny house project, we had sat with different testing centers, such as DVGW-EBI, and worked with them to evaluate risk analyses and to determine and perform the necessary tests and investigations. We also participated in

From here to the energy revolution: for two years, Intergas has been working on hydrogen for heating. But the tiny house is not the crowning glory: Gerrit Zijlstra already has his eye on the next project.

"Hydrogen is both: storage and energy, which makes it an effective solution for the energy transition. Therefore we are exploring this as a solution."

PETER COOL —— CTO INTERGAS

the European 'Testing Hydrogen in Gas Appliances' project, or THyGA for short, and were invited in the standards consortium to participate in drafting the European guideline for the use of 100 percent hydrogen for gas valves in heating technology. Our network in Europe enabled us to provide Intergas with very quick support in the collaboration with Dutch testing center Kiwa."

From tiny house to residential area

Since then, the tiny house has completed its tour and has left a lot of lasting impressions. "The visitors were thoroughly impressed, and the first thing many of them did was check whether warm water actually comes out of the tap," says Zijlstra, who was there himself at some stops. The tiny house is now at its final location in Hoogeveen, and Intergas is starting its next hydrogen project: a part of the village Wagenborgen in Groningen, with houses from the 1970s, will be connected to a hydrogen network at the end of 2022. From that moment on the residents of 33 houses will heat with a hybrid system—with hydrogen boilers and small heat pumps from Intergas. However, with older houses, some of which are even listed as a historical monument, it is often not possible to install heat pumps for heating to bring them up to a level that is in line with the energy transformation. "For these houses, hydrogen is a simple solution that is also quick to install: based upon our experience with current gas boilers, an installer only requires a morning to install an H2 boiler. With hydrogen technology, we can accelerate the transformation," says Gerrit Zijlstra, adding: "With the 100 percent hydrogen boiler we are ready for a sustainable future. This is pretty exciting for us." ●

Miquel Gonzalez | Fotogloria

COMPANY
Becksteiner Winzer e.G.

LOCATION
Beckstein, Germany

Making fine wine a safe prospect

To protect his employees, Michael Braun of the Beckstein winegrowers' cooperative replaced his old ventilation system with a new one. The system reliably draws dangerous fermentation gases outside, while also creating more room and peace and quiet for wine production.

Last check before the harvest: Michael Braun checks the degree of maturity of the grapes so that a perfect wine is produced during the fermentation phase. Since the retrofit, he no longer has to worry about fermentation gases in the cellar.

Lukas Zwiessele

It's high season at the winegrowers' cooperative in Beckstein, located in the Main-Tauber district of Baden-Württemberg. Michael Braun, managing director of Becksteiner Winzer, walks through the vineyards and takes samples of different grape varieties. They decide which grapes will become wine next. Since its foundation in 1894, the winegrowers' cooperative with its 21 associated municipalities has grown to a vineyard area of 250 hectares, and the choice is correspondingly large. In the end, a Weissherbst and a Silvaner are chosen. "We deal with wine here—a beverage designed to be fun and make our lives more enjoyable," says Braun, who turned his hobby into a profession eight years ago. "We produce around 2.3 million liters per year. To ensure that every drop in every glass is outstanding, we work with very high quality standards. This also applies to the safety of my employees."

Caution, danger to life!

After the harvest, the grape juice must ferment so that the fructose is converted into alcohol. Beckstein's fermentation cellar has room for over 160 fermentation tanks holding 4 million liters. The starting signal for fermentation is given by the addition of yeast. However, one waste product is fermentation gas, carbon dioxide. This makes the process dangerous: "We have an extra ventilation system in our fermentation cellar for this purpose," explains Michael Braun. "It draws off the fermentation gas and ensures the well-being of our employees by supplying sufficient oxygen." Carbon dioxide is heavier than oxygen and for this reason settles unnoticed on the floor of the cellar. If the concentration increases, employees are put at risk. A fermentation gas extraction system on the cellar floor ensures safety.

But this extraction system was getting on in years: "I knew we could be even better and more efficient with a new system," says Braun about his decision to retrofit. "The old system ran 365 days in peak operation, but in fact our high season only lasts about 40 days a year. That alone indicated to me huge potential for savings as well as relief for the ears of the employees who work there all day." The decisive factor was a fan replacement campaign by FGK, Germany's professional association for buildings and indoor air quality, with an associated funding program for upgrading to more energy-efficient fan systems in non-residential buildings. "We received a notice of a 40 percent grant for the retrofit," says Braun. "That was a nice bonus that supported our decision."

Michael Braun (left) and Harald Rudelgass in the fermentation cellar. Thanks to the retrofit, carbon dioxide and noise are no longer an issue.

Lukas Zwiessele

"With the retrofit, we have gained valuable production space that helps us to continue growing our cooperative."

MICHAEL BRAUN

MEMBER OF THE BOARD OF DIRECTORS AT BECKSTEIN WINEGROWERS' COOPERATIVE

Turning a chimney into a Multibox

Then things got underway. Systemair GmbH, local supplier for efficient ventilation systems, took a closer look at the system: "It was running a belt-driven axial fan from the early 1970s," explains Harald Rudelgass, Associate Director Technical Regulatory Affairs at Systemair and head of the project. "According to our readings, the system had an efficiency level of about 60 percent. So we were able to confirm to Mr. Braun that with cutting-edge EC technology, things are much better these days."

Rudelgass opted for a ventilation solution with two ebm-papst RadiCal fans with EC technology installed in Multiboxes from Systemair. "With the new RadiCal, we had exactly the size 710, which was a good fit here, as well as state-of-the-art EC motors with an efficiency of 90 percent—which then also has a positive effect on overall system efficiency," he says. "Our Multiboxes allowed us to make airflow more flexible, redirecting it 90 degrees from the previous straight direction."

This was a crucial advantage, as the winegrowers' cooperative was not only swapping something old for something new, but also replacing a large system with a small one. Where once there had been the large axial fan, complete with exhaust chimney, space was freed up with the current RadiCal fans, which discharge air to the outside under the roof at a 90-degree angle: "We gained valuable production space with the retrofit, which will help us grow even further as a cooperative," comments Michael Braun on the outcome. Where air used to be piped out, new bottling lines now pour wine into bottles.

Twice as safe, precisely controlled, quiet and clean

And in terms of safety, too, the retrofit had great benefits: The solution with two fans arranged in parallel protects the system against failures. If one of the two fails, the other can keep the gas concentration low enough to be safe for the employees. Efficiency is ensured not only by the EC technology but also by the precise control on two levels. The system only provides full power when the high season requires it. An additional CO_2 sensor helps and automatically turns the fans down when the appropriate air quality is achieved.

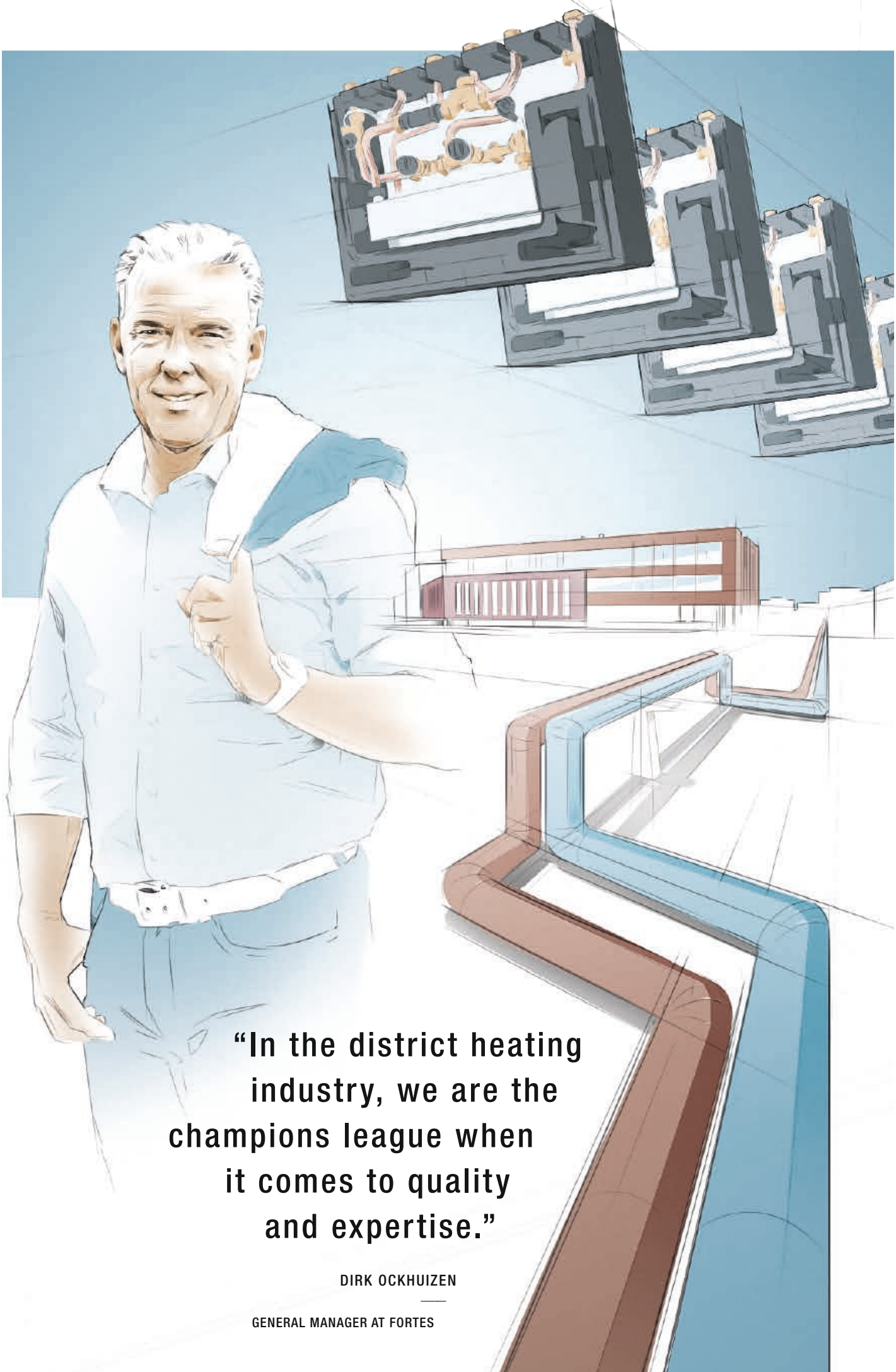
The ventilation system is 15 dB(A) quieter as required and thanks to the RadiCal's backwards-curved impellers, there is an extra advantage in terms of cleanliness: "On the old fan, we clearly saw that dust particles were also sucked in during operation," explains Harald Rudelgass. "The backward-curved blades have the appeal of cleaning themselves by running in the opposite direction, so nothing gets stuck there." This in turn ensures a long service life.

One retrofit down, one to go

"We are now in the middle of the season where the fermentation gases are produced," says Michael Braun. "Everything has been completed on time and we are very satisfied with the system's operation. It's so quiet that we almost don't notice it." The theoretical savings of 30 percent have already been achieved. At an estimated operating time of 2,500 hours per year, this corresponds to around 7500 kWh. The savings are likely to be even greater.

But, before that, there are already plans for another retrofit for a second fermentation cellar—once again together with Systemair and ebm-papst technology. "In ebm-papst, we have found a reliable partner for ventilation technology for more than two decades," says Harald Rudelgass. "We have been purchasing ebm-papst fans for several product generations due to their EC technology and are very excited about what's to come in the future." ●

TAKE A LOOK AT THE VIDEO ABOUT THE PROJECT: mag.ebmpapst.com/beckstein



“In the district heating industry, we are the champions league when it comes to quality and expertise.”

DIRK OCKHUIZEN

GENERAL MANAGER AT FORTES

Timo Müller

COMPANY
Fortes Energy Systems

LOCATION
Houten, Netherlands

Heating from afar

Fortes Energy Systems relies on district heating. The Dutch company delivers more sustainable heat for homes and domestic water with quality, expertise, and a clever heat interface.

In the Netherlands, a lot is happening in terms of moving from conventional to modern, sustainable technology that is more efficient in the long term and protects the environment. According to the government, gas is no longer going to be used for domestic heating and hot water by 2050. Energy supplier Fortes has long since recognized the way things are going and relies entirely on district heating. The company has over 20 years of experience in this field. "We are market leaders in the Netherlands and are very technology focused," says Dirk Ockhuizen, General Manager at Fortes. "In the district heating industry, we are the champions league when it comes to quality and expertise."

The market is growing

Since 2013, Fortes has been using fully electronic heat interface units (HIUs) with an electronic controller from ebm-papst to distribute district heating. The room thermostat in the consumer's house is connected to this unit and reports when heat is required. The interface then electronically opens the lines so that the exact amount of heat or hot water required can be obtained from the mains. This saves energy, because waste heat, for example from data centers, can also be used via the district heating network. This technology has been in high demand for years. "We are seeing growth in the market in the Netherlands," says Paul Kuipers, Product Manager of Heating Technologies at ebm-papst. He says that, around ten years ago, 5,000 of the units were sold per year, and now it is around 30,000. Energy suppliers like Fortes rely on district heating and regulation using units such as the HIU 900 from ebm-papst.

High-quality partnership

In fall last year, the third generation of devices came onto the market, which impress with more connectivity, among other things. Operating information can be accessed from a cloud. "This allows us to see how the unit is behaving," says Paul Kuipers. In the future, the data will also be used for remote diagnostics.

Fortes finds the collaboration with ebm-papst very productive. "As a market leader, our strategy is generally to ensure that our suppliers and partners have a similar position, and headquarters in Europe," says Ockhuizen." We value experience in the heating sector. This also gives our customers security." ●

COMPANY
Artisan Green

LOCATION
Singapore

Fresh vegetables from the heart of the city

Artisan Green grows leafy vegetables in the middle of Singapore. In the company's vertical gardening farm, it is growing spinach and other leafy vegetables under controlled conditions. A special air filter with EC fan produces the ideal climate for the young green plants.

Those who visit Jaime Tan at his place of work can't believe what they see. Tan works for Artisan Green and the company cultivates spinach, baby kale, and herbs. However, you will not find any fields here. Instead, the General Manager's desk is located on the fourth floor of a commercial building in Singapore. Growing vegetables in the middle of the city? Jaime Tan laughs and explains, "We specialize in hydroponics. The roots of our plants are not in the ground but are suspended in a nutrient solution, which contains a mixture of water and dissolved nutrients. They grow in plant racks instead of on farmland." This is also one of the major advantages of vertical gardening: it saves a lot of space. This means that the method fits perfectly into the densely populated metropolis Singapore and with the "30 by 30" program. With this initiative, the government of the city state intends to cover around a third of the food demand with local food products by 2030. With the motto "from lab to table," it subsidizes innovative ideas. Ideas such as the business model of Artisan Green, which was launched in 2018.

Less is more

Jaime Tan explains: "Our farm is a laboratory where we can try out how we can optimize production. It is still not about

A staff member of Artisan Green checks the growth of his green protégés in the vertical gardening farm in Singapore.

Artisan Green

large quantities." Artisan Green is still growing: initially, the team harvested around eight kilograms of baby spinach per week, now it is harvesting as much as 60 to 70 kilograms. In addition, the area available for growing products has been expanded from 10 to 60 percent. The product range has also grown: in addition to spinach, it is now also growing red baby kale, dill and cilantro. Basil, thyme and sage are to follow.

You can buy the leafy vegetables in various supermarkets in Singapore. "At the beginning, some customers were critical and thought that many chemicals would be used for indoor planting. The opposite is the case. The plants are protected from pests, so we do not need pesticides." And they also live up to outdoor varieties in terms of taste. Hydroponics also saves water: the nutrient solution is filtered and then reused. In other words, it is a closed cycle.

A sensitive matter

Before Jaime Tan leads visitors through production, they all have to put on protective clothing. If germs or impurities get into the closed space, it can impair growth or even destroy the entire harvest. "The system is very sensitive. Even slight fluctuations in temperature, humidity, pH value or the nutrient mixture have a direct impact on the growth of the plants," explains Tan and points to the metal racks where

The RadiCal can hack it: the mobile air filter required a high performance in a small space.

their delicate baby spinach and red baby kale are sprouting, under artificial light and in optimum conditions. The team researched these conditions over the past year. "We already know a lot but are getting to know our plants and their needs better and better," says Tan.

Tiny spoilsports

Particular attention is paid to the air quality in the farm. After all, this is what largely decides whether spinach and other leafy vegetables will grow as they should. Volatile organic compounds (VOCs), such as hydrocarbons, alcohols and organic acids, play a critical role here. The particles are a few micrometers in size and are always present in indoor air. If their concentration is too high, they can influence plant growth and the maturing process. A mobile air filter regulates the VOC levels.

Good air for fresh vegetables

Jaime Tan walks over to the 500 by 920 millimeter metal cube on rollers located in one of the aisles. "We developed the device specially for this task. We use an activated carbon filter through which a fan blows the ambient air. Our filter supplier recommended ebm-papst," recalls Tan. All parties involved worked closely together when developing and designing the filter unit. Senior design and application engineer Mr. Hiew Chung Ka from ebm-papst in Singapore visited Artisan Green and recommended a RadiCal EC centrifugal fan with a diameter of 280 millimeters. "The air filter unit must fit into the narrow aisles, so there is limited space. With its compact design and high performance, the RadiCal was a perfect fit," he recalls. "Together with Jaime Tan and his development team, we looked at how much space we needed around the fan. This resulted in an optimum aerodynamic design for the air filter unit."

The fan is currently running at 50 percent of its maximum speed, which is sufficient for the current growing space. If the farm expands, the speed can be increased. Tan and his team noticed immediately after it was first used, "It is very quiet! Our air filter is an important but also inconspicuous element in our farm." He adds with a laugh, "We have not had to do anything for it since it arrived. It is doing its job!" It is not only Jaime Tan who is pleased: the plants are also thriving on their shelves. ●

"The system is very sensitive. Even slight fluctuations in temperature or humidity have a direct impact on plant growth."

JAIME TAN —— GENERAL MANAGER AT ARTISAN GREEN

Artisan Green

Vigilant fire preventer

Fires on ships prompt primal fears and cause expensive damage. When smoke starts rising anywhere, the only aim is to prevent the worst from happening. Gas detectors from Daspos do not let it get that far in the first place: they detect gases and oils in the air and trigger an alarm before they ignite.

Daspos A/S

COMPANY
Daspos A/S

LOCATION
Herlev, Denmark

It sounds frightening when the fire signal from the ship's siren resounds over the deck and a loudspeaker announcement warns of a fire on board. Fire poses a major risk to passengers and staff, whether it is on ferries, cruise ships or commercial ships, as there is no escape—except for emergency boats—and toxic fumes spread quickly through the ventilation systems and air conditioners. Although fire regulations in shipping are very strict, hundreds of fires occur every year, especially on commercial ships. Most of them break out in the machine room, where ship fuel is pumped at high pressure from the tanks to the engines in pipes. If leaks occur, highly flammable fuel vapors or gases escape. The conventional fire protection detectors prescribed by law react to smoke, flames and heat, but if these occur, it is already too late. With the LAS-10, the developers at Daspos designed an active detector, which detects gases and vapors as well as resulting fine oil particles in the air and sounds the alarm before the substances can ignite.

Is the coast clear?

At the heart of the gas detector from the Danish shipping technology experts at Daspos is a highly sensitive sensor that permanently scans the ambient air. To ensure that as much air as possible flows through the detector chamber of the LAS-10, a powerful, specially developed blower from ebm-papst sucks up to 10,000 liters of air through a stainless steel filter per minute. The electronics constantly analyze the air composition and compensates for it with specified set values.

Torben Lintrup Kirkholt, Managing Director of ebm-papst in Denmark explains: "Air consists mostly of nitrogen and oxygen. If there are oil particles in the air, they stick to the filter and make it more difficult for air to flow through. Then, the detector sounds an alarm."

Robust powerhouse

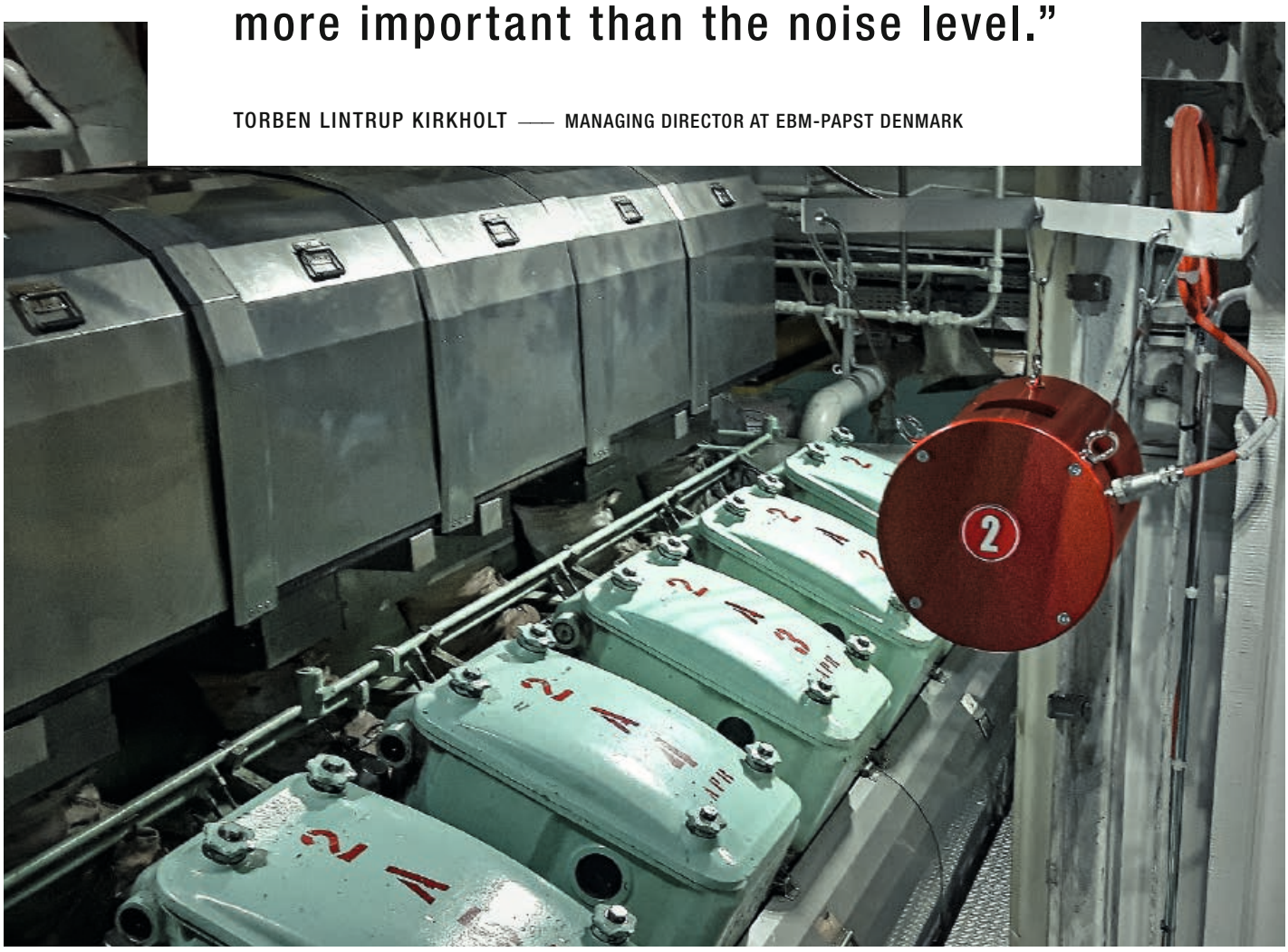
Daspos could patent the idea for predictive fire detection at the beginning of the 2000s. Together with Danish shipping companies and the Danish Technological Institute, it got the LAS-10 ready for the market by 2011. The S-Force axial compact fan from ebm-papst has been part of the overall system since 2013. Kirkholt says, "Initially, we used a different fan. However, in practice it proved unsuitable for high seas. Thanks to its robust finish, the fan from ebm-papst can also withstand the harsh environment at sea."

The S-Force axial compact fan also has other advantages: it can be controlled in continuous steps from 1,000 rpm to 7,000 rpm using a PWM signal and the open collector tach signal enables the speed to be continually monitored. This flexibility is beneficial because up to 48 different areas of a machine room can be monitored with individual settings. The powerhouse is not particularly quiet in this configuration, but it does not have to be, as Kirkholt says with a smile: "It is very loud in a machine room anyway, so the noise level of the compact fan is not important. The performance, reliability, and robust finish are more important."

Torben Lintrup Kirkholt likes the fact that ebm-papst also serves smaller markets with modified solutions. Besides, he is certain that his solution has the potential to be successful in other areas as well: "The detector can be adapted to meet the requirements in power stations or refineries, for example. The example of shipping has shown us that anyone who has experienced a fire on a ship does not have to be convinced. Avoiding a fire before it starts is always the best option." ●

> “In a machine room, performance, reliability, and robust processing are more important than the noise level.”

TORBEN LINTRUP KIRKHOLT —— MANAGING DIRECTOR AT EBM-PAPST DENMARK



Daspos A/S

COMPANY
Bonferraro S.p.A.

LOCATION
Bonferraro, Italy

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Hospitals and laboratories are subject to stringent hygiene requirements. Simply cleaning utensils used in operations, such as scissors, tweezers, clamps, test tubes, and pipettes is not sufficient, because the biggest danger is invisible to the naked eye: bacteria, viruses, or chemical residues can falsify measurement results in laboratories or, in the worst case scenario, can cost human lives. With his work, Ezio Gobbi and his team helps to ensure that this does not happen. For over 30 years, the engineer at Smeg, since 2009 in the manufacturing unit of Bonferraro, has been developing thermal disinfectors. These special washing devices ensure that utensils are perfectly cleaned in hospitals, doctor's offices, and research facility laboratories.

Bonferraro is based in the community of the same name in the Province of Verona, Italy and is the subsidiary of household appliance manufacturer Smeg. The company has been manufacturing thermal disinfectors since 1987. "There are only around ten manufacturers worldwide that make such devices," says Gobbi. Most recently, the R&D team was tasked with developing three types of devices with wash chambers ranging from 250 to 450 liters, in other words, high-performance devices that have to operate with maximum reliability. And not

GERM-FREE WASHING

Bonferraro's high-tech washer-disinfector reliably cleans germs off medical and laboratory instruments. The drying phase at the end is a crucial part of the washing program. The Italian manufacturer relies on a blower that is usually used in condensing boilers.

only when it comes to cleaning results: "If a dishwasher at home fails for a few days, it is irritating but not disastrous. However, in hospitals or laboratories, work is severely disrupted," says Gobbi. This means that the technology installed must be 100 percent reliable.

Disinfection in the high-tech dishwasher

A thermal disinfector works in a similar way to a dishwasher at home. There are washing and rinsing phases, and the items are dried at the end of the program. However, there are also major differences. The devices have to work with much greater precision than those in the kitchen at home, and they are subject to the strict requirements of medical products. This even applies to the removal of coarse dirt. "If residue persists, the sterilizer is then unable to completely kill bacteria even at 140 degrees Celsius," says Gobbi. This is not so easy, as the objects to be cleaned come in a much greater variety of shapes than pots, dishes, or cutlery in the kitchen at home, for example. Everything gets put in there, from scissors and test tubes to hoses. This is why special carrying systems are required to allow the water to get everywhere. The water supply and the special cleaning chemicals must also be dosed in exact amounts and the temperature must be regulated precisely. Therefore, a thermal

disinfector has an additional disinfection phase, during which it is important that the temperature is between 90 and 93 degrees Celsius exactly.

Reliably dry

Drying begins when disinfection is complete: the crucial phase. There must be no droplets of water left on the objects so that they can then be immediately shrink-wrapped and put into the sterilizer. Depending on the shape and material, this process takes between 15 and 30 minutes. "For example, plastic is much harder to dry than glass," says Gobbi. Here too, the choreography is finely tuned: first, air is blown into the washing chamber at low pressures so that the steam escapes slowly. Then hot air is supplied at different speed levels and at up to 120 degrees Celsius. "We developed a drying cycle here that works as quickly and efficiently as possible," says Gobbi. The blower is the crucial component for this process. It had to be especially powerful for Gobbi's three new types of devices, also because it has to cope against the resistance of the HEPA filters. HEPA stands for High Efficient Particulate Air. The filters prevent germs and dust particles from outside entering the washing chamber.

So Gobbi approached ebm-papst: "For me, it was the logical step. We have been working together for more than 30 years on other projects." Gobbi says the other projects involved usual household dishwashers, which Bonferraro also manufactures. But the blower solutions used for these devices were insufficient for Gobbi's requirements or would be too large for the available installation space at the required power. And a tailored solution was out of the question: "This is not a mass market like with household dish-

> **"The requirements were just right for the blowers that we otherwise use in condensing boilers"**
>
> FABIO MILANI
>
> KEY ACCOUNT MANAGER AT EBM-PAPST

How a thermal disinfector works: A hospital as an example

During an operation, a surgeon uses numerous instruments: scalpels, scissors, tweezers, and many other different operating utensils. Some are thrown away immediately after use. Others have to be cleaned, disinfected, and sterilized before they return to the operating room.

01

Cleaning begins

In hospitals, the thermal disinfector is located between an unclean room, from which it is loaded, and the cleanroom, where the cleaned instruments are picked up. Therefore, it has two doors. Before loading, a specialist pre-cleans the instruments manually.

02

The washing program

As with a normal household dishwasher, it switches between washing and rinsing phases. However, the processes in a thermal disinfector, such as supplying cleaning chemicals, are controlled much more precisely.

washers. We simply do not have high enough quantities of them: it would not pay off. We needed a product that had already been developed."

A solution from the boiler

Therefore, Fabio Milani, Key Account Manager and Gobbi's contact at ebm-papst Italy, had to look for a different way, working with the experts in Landshut. "The power requirements described by Gobbi were a pretty good fit for the blowers that we usually use in condensing boilers: the VGR 118 and the VGR 148," says Milani, adding, "a particular version of VGR 118 had a high-performance motor to make one blower suitable for all three types of devices." Thanks to EC technology, the blower types enable high speeds and, as a result, high pressures that can overcome the HEPA filter, and all that with a compact design. They are also infinitely adjustable so that the speed can be precisely adapted to the different drying phases. So the perfect solution? Almost, if it were not for the venturi attached to the blowers as standard. In condensing boilers, it is essential for regulating the gas supply. In Bonferraro's thermal disinfectors, it would just be disruptive.

Out with the standard solution and on to the more expensive customized solution then? Something else happened. Milani explains: "As happens by chance, the same blower was being created at the same time as variants without venturi." Gobbi benefited from this. He can also use it for his three types of devices. "In addition to the performance characteristics, the geometry was a perfect fit for our requirements," says Gobbi. The three new thermal disinfectors are under development and the start of production is planned in July 2022. The demand for the Bonferraro devices is growing. "The coronavirus pandemic has led to a significant increase in sensitivity to hygiene. And this has impacted our company," he concludes. ●

It works just like the dishwasher at home, only with much greater precision: the thermal disinfector from Bonferraro.

03

Disinfection

Demineralized water is used for the washing process in the disinfection phase. Normal tap water contains too many foreign bodies, such as salts, that could remain on the objects. During disinfection, the temperature must remain constant at 90 to 93 degrees Celsius.

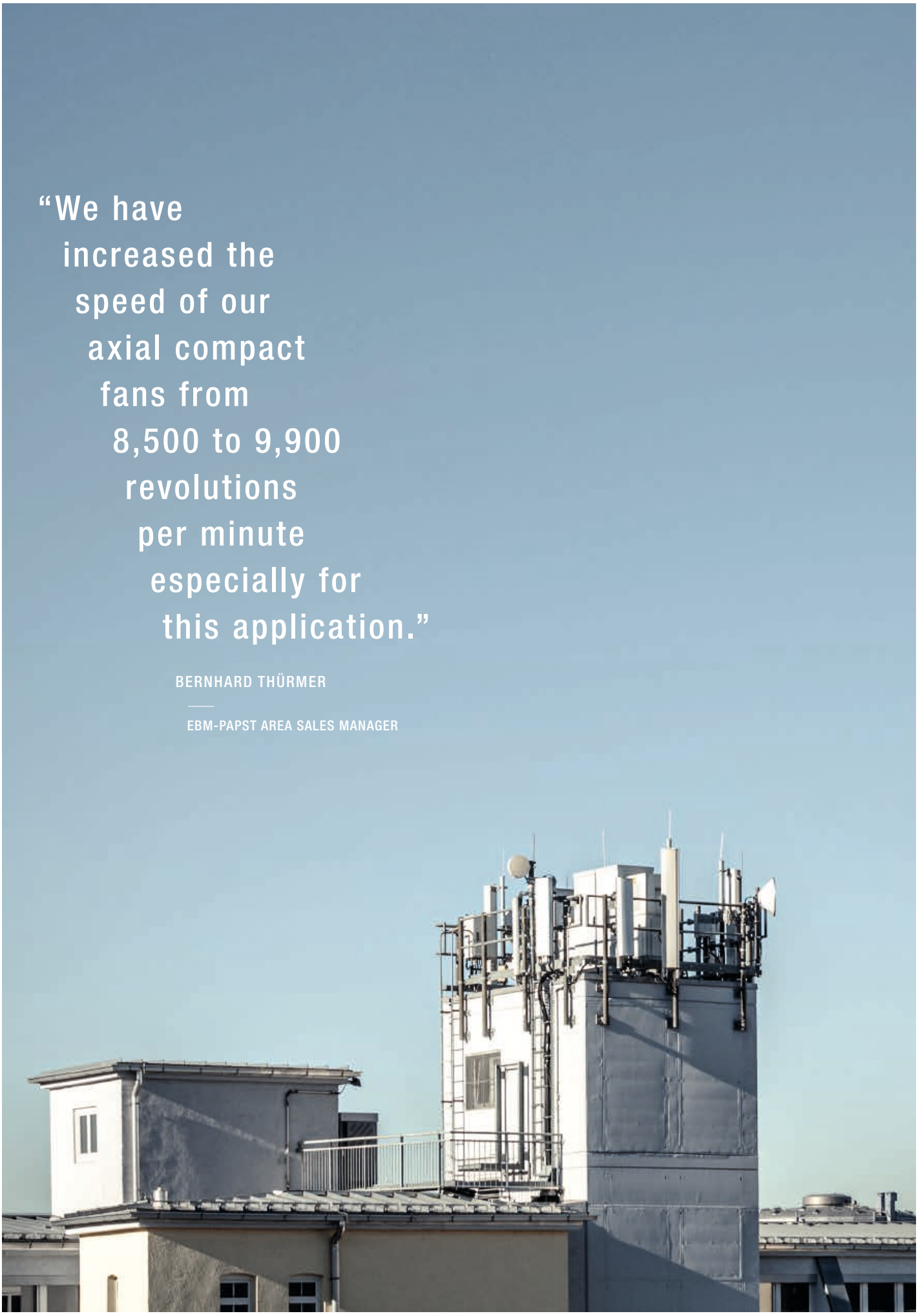
04

Drying

The drying process comes at the end of the program. Bonferraro developed a finely balanced system for this process. There, the blower overcomes the HEPA filter with high pressure.

Depending on the selected program, the entire rinsing program takes between 25 minutes and just under two hours. From the cleanroom side, the disinfected instruments are removed, bagged and then put into the sterilizer. Only then are they ready to be used for the next operation.

Bonferraro S.p.A., Christoph Kalscheuer



"We have increased the speed of our axial compact fans from 8,500 to 9,900 revolutions per minute especially for this application."

BERNHARD THÜRMER

EBM-PAPST AREA SALES MANAGER

Gernot Walter

COMPANY
SK Telesys

LOCATION
Seoul, South Korea

5G in every corner

South Korean telecommunications company SK Telesys is bringing the 5G mobile network to every corner of large buildings with its remote radio units (RRUs). Three axial compact fans with extra power provide cooling for the RRUs.

The RRUs from South Korean manufacturer SK Telesys bring 5G to all corners of a building.

The new 5G wireless standard promises a rosy future—and not only as a key technology for faster machine-to-machine communication in the IoT environment: Tens of thousands of people will be able to surf the net on mobile devices at trade shows or in soccer stadiums without any problems—all at the same time and at ten times the speed offered by its predecessor, 4G. For this to work, large buildings such as shopping malls and stadiums need what are known as 'RRUs,' which pick up the signal from the large 5G antennas and transmit it into the building. This is because 5G has one disadvantage: it uses a shorter wavelength frequency for its high data transmission rates. This has a shorter range and is often absorbed by the walls of buildings, resulting in annoying dead spots inside.

If SK Telesys has its way, however, these dead spots will be a thing of the past. With its RRUs, the telecommunications company from South Korea's capital Seoul is bringing 5G to even the remotest corners of buildings—without any loss of speed and for use by many people at the same time. The RRUs can be installed both inside the building and outside, for example on the roof. This is particularly advantageous in warmer regions around the world, as the RRUs also generate a lot of heat with all the 5G data traffic, which can be dissipated better outside.

Full coverage thanks to cool solution

To ensure that SK Telesys' RRUs do not overheat and do not cause power failures in the buildings, the company relies on a custom-fit, high-performance cooling solution from ebm-papst. A total of three axial compact fans are used for this. Bernhard Thürmer, Area Sales Manager at ebm-papst, explains: "SK Telesys' remote radio units require a lot of cooling capacity. This is why we have increased the speed of our axial compact fans from 8,500 to 9,900 rpm especially for this application." In addition, the fans have very low electromagnetic radiation so as not to interfere with the 5G signal. "Our development engineers designed a new circuit board with shielding components just a few months," adds Thürmer.

Flexible network in any environment

SK Telesys has also equipped its RRUs with weatherproof components for outdoor use. Accordingly, the axial compact fans are also protected from dust, splash water, and salt spray thanks to a fully cast circuit board and stator, and are fully functional at temperatures from -40 to +60 degrees Celsius. So even in tropical areas or right by the sea, the RRUs provide a reliable 5G connection inside buildings—for the best network, anywhere in the world. ●

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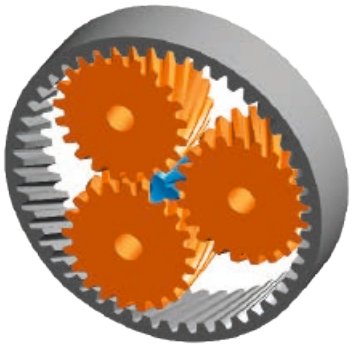
$$\varepsilon_\beta = \frac{U}{p_t} = \frac{h \times \tan\beta}{p_t} = \frac{b \times \sin\beta}{\pi \times m_n}$$

An optimum helix angle makes planetary gears better and more compact. Much more compact.

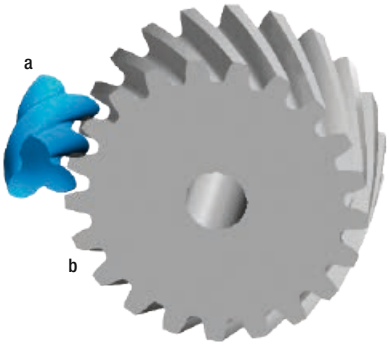
In a planetary gear—or epicyclic gearing—at least two, or often more, planetary gear wheels run in a ring gear. All planets are connected to one another via the "sun," a central gear wheel. This compact arrangement transmits torques in applications where there is little space available. With the right design tricks, you can get a lot more out of planetary gears. An important starting point is the helix angle β on the gearwheels. If the wheels are straight toothed, it is technically difficult to always have a tooth meshing when there are high transmission ratios. This means that the transmission vibrates, is loud and wears faster. Therefore, it is good to design the teeth at an angle and achieve an overlap ratio. Although this is technically challenging, it is rewarded with a smooth operation with low noise and low wear.

The overlap ratio ε_β can be tinkered with. With some of our transmissions, we have optimized the helix angle β with a seemingly paradoxical result: although our sun only has three teeth, every planet has 2.049 teeth meshing at all times, i.e. on three planets, this is a total of 6.147 teeth. In addition to even quieter operation, we achieve one thing above all else: compactness. This means that we can manage with fewer transmission stages one after the other. For a reduction ratio of 17:1, we need just one gear stage instead of the usual two; for a reduction ratio of 204:1, two stages suffice instead of three—always one stage less than usual. This greatly reduces the overall length of the transmission. ●

Stefan Fischer develops planetary gears for industrial drive technology at ebm-papst in Lauf.



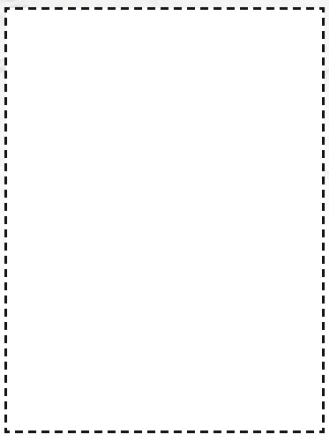
The overlap ratio is an important factor for planetary gears. Although the sun (a) only has three teeth, there are always 2.049 teeth meshing simultaneously on each of the three planets (b), The optimally selected helix angle β makes this possible.



ebm-papst

Sustainability at your fingertips

From this issue onwards, we are having our customer magazine printed on the most environmentally friendly paper on the market.



Lessebo paper is white and sustainable.

You probably did not realize but you are holding sustainability in your hands: with this issue of our customer magazine *mag*, we have switched to the most environmentally friendly Lessebo paper. Its predecessor MaxiScript was also FSC certified, but we wanted even more, in keeping with the spirit of our company creed: "Each product must surpass its predecessor in terms of ecology and economy." Well, this development may not fit the second point, but it is worth it to us.

19 kilograms instead of 600

Lessebo is a small town in Sweden with fewer than 3,000 inhabitants, but it does have a paper factory that has been around for 100 years. The surrounding nature has a major influence on its way of doing business. And the paper, which has been named after the town, is setting new standards: the average CO_2 emissions for other graphic papers are 600 kilograms per metric ton, Lessebo's are just 19 kilograms.

The manufacturer is able to achieve this with its clever mix of decisions. They rely on local suppliers and pulp from local birch trees. This has two advantages: their fibers can be pulped more easily, which is why less energy is used during production. In addition, the birch fibers do not have to be bleached as much because they are whiter than other types of wood.

But the paper factory also relies entirely on sustainability in production: the electricity comes from 100 percent regenerative energy sources such as water and wind and to remove moisture from the paper, the manufacturer heats its drying cylinders using wood chips from surrounding sawmills. The waste heat from the factory and excess energy are fed into the district heathing for the town.

Climate positive!

And as if that were not already enough, the paper manufacturer plants two new trees for every felled one. As a result, it not only achieves a neutral but also a positive climate footprint. We are supporting this holistic view of sustainable action by counting on Lessebo paper for future issues of our magazine. And we have been inspired to take even faster and larger steps towards climate neutrality ourselves. ●

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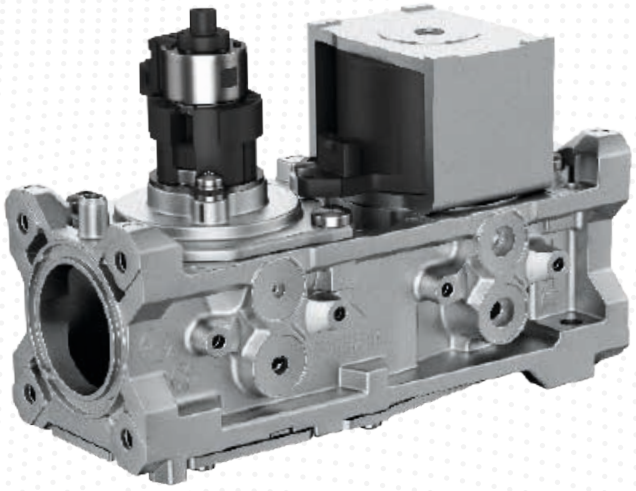

THE POWER PLAYER

The G40 is the largest gas valve in the F01 series. Multiple valves can be connected in series for use in powerful blowers. They achieve an output of 762 kilowatts. Designed for the electronic composite system, the valve actively controls the supply and adapts the gas. This means that gas types and qualities do not have to be entered manually.
ebmpapst.com/valves

THE BEST OF BOTH WORLDS

The DiaForce combines the best of axial and centrifugal fans, ensuring optimum cooling in telecommunications and automation technology. Thanks to its aerodynamic optimization, it is 6 dB(A) quieter, while the air performance is up to 50 percent higher than that of a comparable high-performance axial compact fan. Thanks to the intelligent Fan-Check maintenance concept, the EC motor is fully communicative and ready for predictive maintenance.
ebmpapst.com/diaforce

LARGE ICE BREAKER

The AxiEco is now also available in sizes 630 to 910. Like the previous sizes, they ensure that heat exchangers need to be de-iced less frequently. Thanks to their high efficiency and low energy consumption, the ErP Directive does not give the AxiEco a headache. The impeller, integrated diffuser ring and hub are merged, reducing the noise by up to 6 dB(A).
ebmpapst.com/axieco

»The air volume is identical in both directions of rotation«

The AxiRev 126 is the new standard for efficient push-pull applications in residential ventilation. Tobias Sieger, responsible for the ventilation design and flow simulation, explains how the reversing fan achieves this.

Mr. Sieger, why is the AxiRev needed?

With increasing requirements for environmental protection and energy efficiency, more and more buildings are being insulated and rooms are being sealed airtight. However, to ensure a healthy, pleasant indoor climate, a different form of air exchange is required. Decentralized residential ventilation units are being increasingly used for this purpose because they can be easily installed in existing building facades. However, the fans used face several challenges, which the AxiRev solves in an optimal way.

What are these challenges?

Firstly, the fans have to deliver a constant air flow in both directions of rotation, even when the wind force changes. Secondly, they should operate very quietly while consuming as little electricity as possible.

And the AxiRev does all of that?

Yes, we have developed the new AxiRev reverse fan specifically for these push-pull applications. In this type of application, the fan changes its direction of rotation every minute. We equipped it with new low-noise motor technology and an innovative aerodynamic design. The result is a uniform air flow, pleasant noise level, and maximum energy efficiency.

How did you make it windproof?

The characteristic curve is very steep, which means that, even in stormy weather conditions, there are only slight fluctuations in the air flow. This means that wind and storms have little influence on the efficiency and functioning of the decentralized residential ventilation unit. The almost symmetrical blade design ensures that the characteristic curve and thus also the volume of air conveyed are identical in both directions of rotation.

How did you reduce the noise?

This is based on a wide range of design and aerodynamic details. The striking blade tips and the openings at the ends of the blades minimize noise induced by the tip gap vortex, which in turn reduces the noise emissions. The thirteen struts with an aerodynamic profile also reduce turbulent trails, which ensures a very good psychoacoustic noise quality. This means that the fan is not only quiet but its operating noise is also perceived as pleasant. The highly efficient EC motor developed especially for this application also works without annoying commutation or switching noises, even at extremely low speeds—and flow design and motor technology also enable very low energy consumption. ●

YOU CAN FIND MORE INFORMATION AT:
ebmpapst.com/compactpower

Lower noise level by up to **5** *dB(A)* compared to predecessor version

Large speed range of up to

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7% higher overall efficiency compared to predecessor version

Reversible rotation

Gernot Walter

Gernot Walter