



TOO COOL TO TOUCH

At Refresco,
systems from Krones
ensure reliably
refreshing drinks.



Dear readers,

This pandemic has fundamentally changed the world and made us confront huge challenges in an extremely short period of time. At our Chinese sites, we were able to see what to expect early on. This is why we took the situation very seriously very quickly, and rigorously put safety measures and a task force into place back at the beginning of February. Thanks to our local-for-local strategy, our regional units were largely able to react independently, in line with the situation on site. This meant our sites in China, for example, were able to go back to 100% a few months ago. This has helped us to withstand the crisis relatively well so far.

Of course, in certain areas we have also had to cope with drastically reduced orders. But on the other hand, the number of inquiries has increased in medical, refrigeration, and air conditioning applications, for example, with regard to air filter systems. Read the story about Tri-Kleen for more on this topic (page 22).

We are convinced that indoor air quality will play a more important role in the long term. This is why we are offering intelligent solutions for this area with our digital think tank ebm-papst neo, among other things. And in everyday life, we are also increasingly taking new digital paths.

We have sounded out the possibilities of mobile working, held virtual trade fairs—and even held our ebm-papst marathon as a virtual event this year.

I wish you every success in your new paths and above all good health!



Stefan Brandl

CEO OF THE
EBM-PAPST GROUP



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Clean drinking water for all: In many parts of the world, like here in the family health center of Nioumamilima on the Comoros, this is not a matter of course. The French start-up T.zic fights this problem with a new **TECHNOLOGY FOR WATER DISINFECTION**. UV light is used to eliminate all pathogens quickly and without additional chemicals. Thus, water can be treated directly at the places where it is needed most urgently. Axial compact fans from ebm-papst ensure perfect cooling of the LED UV lamps in the disinfection box. *Read the whole story: mag.ebmpapst.com/tzic*








It is not just a feast for the eyes: the **AURA 4.0 AMBIENT RECIRCULATION HOOD** from Miele is a delight for all the senses. The special dehumidification function ensures a pleasant atmosphere in your kitchen at home, along with the right mood lighting. The sensational aspect: Three sensual fragrances that are only available from Miele freshen up your kitchen for up to 150 hours. An axial compact fan from ebm-papst atomizes the delicate fragrances from the bottles into the air, banishing unpleasant cooking odors from the room—an idea that passes the smell test! *You can find out more about the olfactory highlight online: mag.ebmpapst.com/miele-aura*





A heating system saves lives

Weekend shifts and working late into the evening: the Viessmann Group, one of the world's leading manufacturers of air conditioning and energy solutions, also began producing face masks and disinfectants in the early stages of the pandemic. The company's staff then came up with the idea of converting

a gas wall heating system into a respirator. With support from its partner ebm-papst, the company developed a sophisticated but less complicated solution, consisting of components that were already available. ●

Read the whole exciting story online: mag.ebmpapst.com/viessmann



“I am a passionate fan of quality”

Johannes Pfeffer has been a new member of the ebm-papst Group’s Management Board since April 1, 2020. His mission: customer focus, speed, and quality.

You are new to the Management Board. What are your plans?

Together we are pursuing two goals. Firstly, we want to achieve profitable growth and hit three billion in revenue. Secondly, to achieve this sustainably, we are aiming to take part in and benefit from the major changes in society and industry—environmental transformation, the accelerated digitalization of processes and value streams, and the transformation of mobility. My role in this is to bring us even closer to our markets and customers. This is already one of our strengths. And we want to expand on it.

How are you going to do this?

As part of the Management Board at St. Georgen, I have had positive experiences with the organization of the company into business units. These units are smaller, more independent, and are more focused on the business. This enables us to respond much more quickly and directly to the customer’s needs and “sense” the direction the respective markets are developing in. This is a huge advantage, particularly in fast-changing times. The principles behind the business units should therefore set a greater precedent for the entire company. However, this “speedboat agility” only works if we continue to master one crucial aspect.



Johannes Pfeffer is launching a global quality offensive at ebm-papst.

What crucial aspect do you mean?

Quality. I’ve been a passionate fan of quality since starting my career, which is why I feel so at home at ebm-papst, too. After all, the utmost quality is our goal, and this will always be the case. But sitting back and relaxing would be wrong and dangerous. We want to be proactive and preventative in achieving even better quality in all areas. Of course, our customers mainly link ebm-papst quality to our products, but it also involves ordering processes, supply processes, joint deliberation, documentation, service processes, and so on. We are in the process of launching a comprehensive, global, and long-term quality offensive.

What will customers notice from this quality offensive?

Nothing.

What do you mean?

Quality is like your health. You only notice it when there’s a problem. I do not want our customers to notice anything. Everything should just run perfectly when you work with ebm-papst. It is my role to ensure this. ●

DO YOU HAVE FURTHER QUESTIONS ON THIS TOPIC? PLEASE CONTACT: ANJA.NIESSNER@DE.EBMPAPST.COM

A towering advantage

Bottling and packaging specialist Krones now also offers cooling towers perfectly tailored to its systems. One of the first to benefit from the custom, cost-effective, and efficient solution is the bottling giant Refresco.



COMPANY
Refresco Group

LOCATION
Sittard, Netherlands

Sven Breitfeld
is delighted that
he has only one
contact partner for
cooling towers and
bottling systems:
Krones.





In Sittard, Refresco fills 400 million cans every year on Line 8 from Krones. The line was put into operation in 2019.

They call themselves the “Kings in Cans”—and the approx. 400 employees at the Refresco site in Sittard, Netherlands, are not exaggerating when they say this. Every day around four million cans whiz across numerous conveyor lines here through various bottling plants. They are filled with energy, sports and refreshment drinks or beer, and then end up on the shelves of renowned food chains and discount stores worldwide. Each year 400 million cans alone pass through the new Line 8, which Refresco procured from Krones and was started up in 2019. The special thing about it is that the turnkey line is one of the first bottling plants that Krones supplied with a self-designed

T

cooling tower. Sven Breitfeld, Production Process Manager at Refresco in Sittard, explains: “We were already using several individual machines and another turnkey line from Krones. For us, the new complete system is advantageous because we only have one contact partner for it. This simplifies a lot of things. Like us, Krones is committed to constantly improving products and optimizing them through innovation. The cooling towers tailored to the plant are a good example of this.”

With a turnover of around 2.3 billion euros, the Refresco Group, which is headquartered in Rotterdam, is the world’s largest independent bottling company for retailers and branded beverage



“We have a comprehensive sustainability strategy, which includes energy-efficient production.”

SVEN BREITFELD

PRODUCTION PROCESS
MANAGER AT REFRESCO
IN SITTARD

companies in Europe and North America. With 61 sites around the world, the company does justice to its motto of “Our drinks on every table.” Across the whole company, around 30 million liters of drinks from different manufacturers are produced and bottled every day—including fruit juices, iced teas, energy and sports drinks, mineral water, beer, and much more. Sven Breitfeld: “We offer our customers innovative production and bottling solutions, along with a high level of quality. But we are also aware of our responsibility as a market leader. We have a comprehensive sustainability strategy, which includes energy-efficient production and we work together with partners who offer the right solutions.”

A cool decision

One of these partners is Krones, the bottling and packaging specialist headquartered in Neutraubling, Bavaria. For years, developers here have been working intensively on resource-saving and energy-efficient solutions for the industry. The world market leader has considered itself more than a mechanical and plant engineering company for a long time now. The company invests around five percent of its annual turnover in research and development, and currently has around 6,000 patents. It is no surprise that the plant developers were itching to investigate

the emerging cooling tower market. Previously, Kronen had only purchased cooling towers. But the product is hot property: Whilst in recent years refrigerating plants or fresh water have still mainly been used for cooling in production, the demand for cooling towers as an additional component is constantly increasing.

Cooling towers form a second cooling circuit within a bottling plant. First of all, the filled cans or bottles are showered with cold water following pasteurization. This water is cooled by refrigeration plants or cooling towers depending on the temperature level. The energy expelled for this is optimally used with the help of recuperation cycles. If a recovery cycle stops in certain operating states, working heat develops that has to be dissipated quickly because it can affect the appearance and taste of the products. This is where the cooling tower comes into play, explains Christian Depner from Product Treatment Technology at the Kronen site in Flensburg: "It takes over the cooling to a certain level, and is much more economical than the refrigerating plant in the process."

It was therefore obvious for Kronen to expand their already extensive portfolio with this promising component. Of course, with a version optimized for processes, completely in line with the perfectionism of the company.

Perfectly coordinated solution

The specialists at Kronen incorporated their pooled expertise for the cooling towers. The earthquake-proof stainless steel construction is welded instead of having screws, and is designed in such a way that it provides bacteria with as little contact area as possible. Christian Depner helped with the process engineering-based design of the cooling capacity. He explains: "Four years ago, as a student trainee, I dealt with the design of cooling towers in my Bachelor's thesis. A calculation basis was

"The cooling tower takes over the cooling in a much more economical way than the refrigerating plant."

CHRISTIAN DEPNER

PRODUCT TREATMENT
TECHNOLOGY AT KRONEN
IN FLENSBURG



already there, but we also took some additional factors into account that illustrate the reality of our sector even more accurately."

Using process expertise to make their own cooling tower

One important factor is the location of the plant, for example: The temperature and humidity of the ambient air have a major influence on the cooling capacity that can be provided for production. In the different areas of the bottling plant, there are also heat-generating energy peaks at certain times during the process. These briefly require a higher cooling capacity, but this can be reduced after a certain period. Seasonal adjustment of the cooling capacity is just as important as when changing the product. Christian Depner explains: "If for example juices are bottled hot, short and intense cooling is required. Other liquids, by contrast, require even cooling over a long period of time."

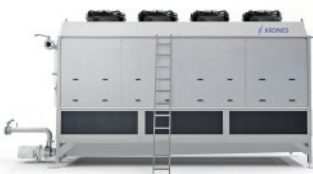
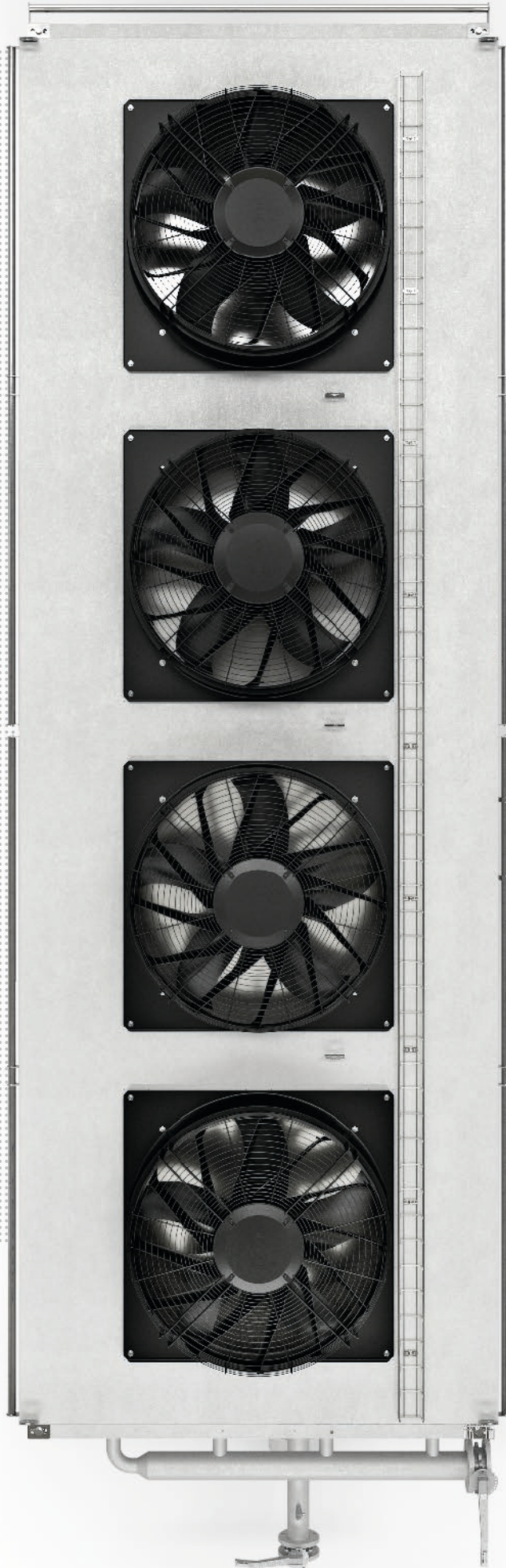
Years of experience with production processes and products, as well as the extensive expertise at Kronen, made it possible for all relevant factors to be taken into account. This has enabled the reactive power of the cooling towers to be reduced to a minimum. To ensure that only the required

cooling is available at all times, the cold water flow that leaves the cooling tower is continuously measured. As soon as the temperature changes to a minimal extent, the power of the fans that temper the water by supplying air is automatically adjusted. This means that the required power is always available, while the customer benefits from less noise and significantly reduced energy consumption.

Quiet, economical, reliable

So that the system functions as required, the fans fitted need to be precisely controlled. They are an

The earthquake-proof stainless steel construction of the Krones cooling tower is welded together and offers bacteria little contact area. The reactive power of the cooling towers is minimal. The required cooling is controlled by continuously measuring the temperature of the cold water flow. If the temperature changes, the power of the fans that temper the water by supplying air is automatically adjusted. Here Krones relies on AxiBlade EC fans, which are ideal for demand-based cooling capacity thanks to steplessly variable control. The AxiBlade axial fans are also equipped with special corrosion protection.





Five AxiBlade fans from ebm-papst run in each of Line 8's cooling towers. This ensures the process reliability required for bottling as optimum quality can only be achieved with reliable cooling capacity.



essential component of a cooling tower. This is why Christian Depner left nothing to chance here: “We looked at various options and then decided on the AxiBlade series from ebm-papst. Thanks to EC technology, the fans can be steplessly powered up and down, thereby always providing demand-based cooling capacity.” Before the fans were used, the developers made important adjustments. Depner explains: “The fans come into contact with aggressive biocides that suppress algae and legionella growth in the water circuit. ebm-papst therefore provided all the AxiBlade series we needed with special corrosion protection. Because we use a control signal of 4 to 20 milliamperes as standard in our systems, ebm-papst also provided us with a special parameterization with the appropriate input.”

More fans = greater process reliability

Depending on the required cooling capacity, between one and eight fans are generally used in a cooling tower. Two cooling towers, each with five fans and a total thermal output of 1,940 kilowatts, are installed in Line 8 at Refresco. Christian Depner explains: “The fans run at an average of 50 percent load. The advantage of multiple installed fans is definitely process reliability. If one fails, the others can be easily ramped up and the cooling capacity maintained.” This bonus in terms of reliability is also important for Production Process Manager Sven Breitfeld: “We need systems that run with complete reliability, guarantee the optimum quality of our products, and fit our sustainability strategy.”

Krones has since built 37 cooling towers and supplied companies in Germany, the Netherlands, Brazil, Hungary, and Africa, among other places. There is a high demand for energy-saving technologies. Sven Breitfeld also sees the Neutraubling-based company as being on the right path: “To us, Krones is a competent contact partner who is also familiar with third-party machines in our lines. The option to now purchase everything, including the cooling tower, from a single source, makes Krones an even more attractive partner for us.” ●

COMPANY **Swire Properties Ltd.**LOCATION **Hong Kong, China**

Sustainable prospects

Swire Properties wants its buildings to be green, modern, and full of variety. The real estate developer is focusing on sustainability when choosing an air conditioning system for Taikoo Place, its futuristic commercial building complex in Hong Kong.

Generous glass walls, plenty of natural light, and a panoramic view of Victoria Harbor—these are just some of the features of One Taikoo Place, alongside air-conditioned pedestrian bridges, cascading water features in the landscaped garden, and outdoor dining areas. The 48-story high-rise, which was completed in 2018, is the latest of nine interconnected office towers at Taikoo Place in Quarry Bay, Hong Kong. Employees from over 300 multinational corporations, including many Fortune 500 compa-

nies, make use of Taikoo Place's 464,000 square meters of work space, with retails and a multitude of restaurants and cafés providing variety. The 650-square-meter ArtisTree venue located in the Cambridge House also hosts a large range of events, from theater and dance to new art forms and exhibitions.

But One Taikoo Place has even more to offer. The building, which belongs to real estate developer Swire Properties Limited, also meets the highest sustainability standards and has already



When the tenant of a 1,500-square-meter floor moved out, it was the perfect opportunity to discover the potential for savings from a retrofit.

received several certificates and awards. As Isaac Tsang, Assistant Building Services Manager, explained: “The building’s particularly green elements include a biodiesel tri-generation system to supply heating, cooling and electricity, a planted two-story roof with an integrated solar unit and sustainable water management, where we reuse rain and gray water for the toilets. But the efficient RadiPac EC fans with Airfoil impeller from ebm-papst in our air conditioners are also part of this.” Swire Properties has been working with the fan specialist since 2015.

Looking for potential savings

“Back then, we realized, that the performance of the air-handling units in our old buildings wasn’t good. We were looking for a way to save energy and also wanted a solution, which with we could adapt the fan speed and power to our current demand of cooling,” said Tsang. “So we approached a local contractor, who made contact with ebm-papst.” Daniel Yiu, Regional Sales Manager at ebm-papst Hong Kong, saw great potential for energy savings and offered Swire Prop-

erties a test. He explains: “The tenant of 22-year old Dorset House, one of the older 34-floor office buildings at Taikoo Place, had just moved out of an entire floor,” he explained. “The almost 1,500 square meters of space was ideal for identifying potential savings through a retrofit.” First, ebm-papst carried out some calculations and simulations. These showed that Swire Properties could make energy savings of 40 percent by replacing the building’s AC fans with EC fans.

This was to be confirmed by a measurement on site. Swire Properties wanted to replace an old belt-driven fan and frequency-controlled drive with RadiPac EC fans without having to replace other components in the air conditioning system. So in November 2015, the local service provider replaced the air conditioning system’s old AC belt-driven fan (power consumption = 22 kilowatts) with four smaller RadiPac EC fans with a total output of 5.25 kilowatts. To do so, the company removed the old motor, the blower, and the associated support frame and installed the new RadiPac EC fans.

The results were known four months later. “They were in line with ebm-papst’s calculations,” recalls a delighted Isaac Tsang. “The new fans delivered energy savings of 40 percent. Furthermore they



“The new fans save 40 percent of our energy and minimize our maintenance costs.”

ISAAC TSANG

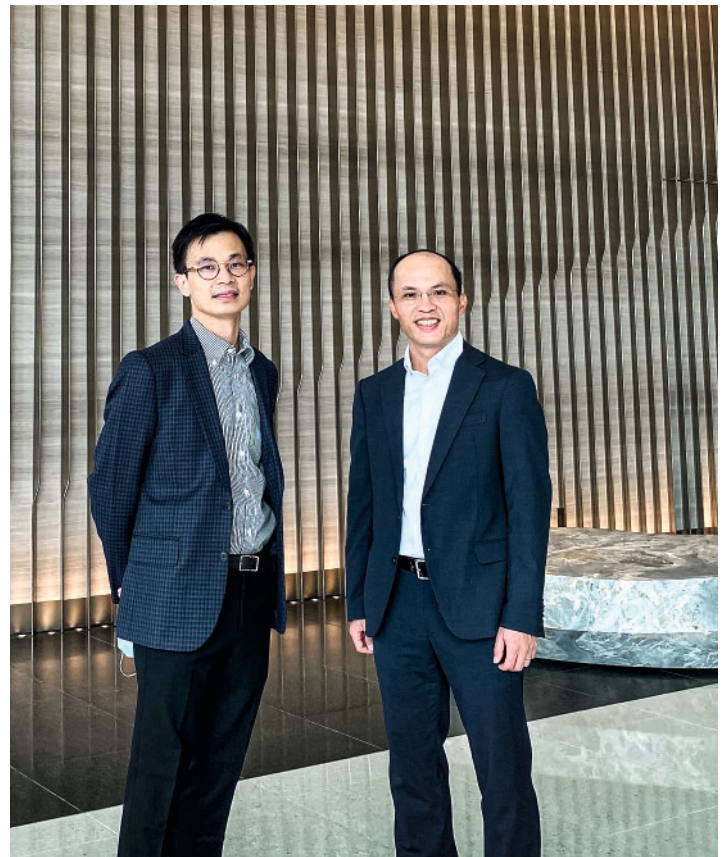
— SWIRE PROPERTIES

minimized our maintenance efforts and provided more operational information. So we decided to replace the fans in all air handling units in the building.” 132 RadiPac EC fans replaced their AC predecessors.

Nine buildings already upgraded

But that wasn’t enough for Swire Properties as the company saw potential to save a lot more money. “We decided to carry out retrofits in other old buildings with a high usage of the fans. Some of our buildings are older than 15 years. The potential to save energy here is especially high and the payback time fast,” comments Tsang. “To date, we have retrofitted nine Grade A commercial buildings and shopping centers, including five of the Taikoo Place office towers, two of the Pacific Place office towers and Taikoo Hui Guangzhou. We are saving 20 to 40 percent of fan energy.” Conversions are to follow in more buildings belonging to Swire Properties.

Swire Properties also uses the efficient ebm-papst RadiPac EC fans for its three new buildings in Hong Kong: Wong Chuk Haung, Citygate, and One Taikoo Place. Also the latest Taikoo Place tower



Isaac Tsang and Daniel Yiu

in Quarry Bay will have environmentally friendly air conditioning. ebm-papst RadiPac EC fans have been pre-ordered for Two Taikoo Place, which is scheduled for completion in 2022 and will have the same remarkable green and well-being features as the first tower. So Swire Properties looks certain to win more prizes in the future—thanks also to efficient ventilation from ebm-papst. ●

Swire Properties Ltd.

Founded in 1972, the real estate company manages and develops numerous mixed-use buildings in Hong Kong and mainland China, Singapore, and the USA. The company’s portfolio includes commercial, retail, hotel, and residential real estate. The company is the sole constituent from Hong Kong & Mainland China in Dow Jones Sustainability Indices (DJSI) in 2017-2019, a family of stock indices that include environmental and social criteria in addition to economic criteria.

COMPANY

Hit the Green

LOCATION

Avry-devant-pont, Switzerland

Driving all by itself



Should I carry or pull my golf equipment? This discussion ends with the “S-Walk” from Swiss company Hit the Green. After all, the motto of the first smart golf trolley is: just let it drive.

If the golfer walks fast, it speeds up; if he walks slowly, it reduces its speed. If the golfer stops, so does the “S-Walk.” The first intelligent golf trolley carries clubs and balls all by itself and the golfer doesn’t have to touch it—and it adjusts its speed automatically. A sensor in the handle makes this possible; the sensor measures the distance from the player and keeps it constant. Cyril Beaulieu, inventor of the device and Managing Director of Hit the Green, explains: “I wanted to develop a trolley that adapts to the person and not vice versa. If it’s slippery or there’s a steep downhill grade, you have to run along behind other electric golf trolleys. Not with the S-Walk: When it’s going uphill, it increases its power; on the downhill, it slows down automatically.”

The hobby golfer had developed bicycles for high-end companies for many years. Their light weight and technical features could also be applied to the golf sport, he thought. In addition to the auto-

matic speed adjustment, Beaulieu also wanted to make the trolley lightweight and very stable. That’s why he relied on a frame made of carbon for the “S-Walk.” While other golf mobiles weigh between 15 and 20 kilograms, the “S-Walk” weighs just 8.5 kilograms. Furthermore, with its lithium battery, it can manage 54 holes or three golf courses with a single charge—twice as much as other electric trolleys. Efficient drive motors from ebm-papst, which are installed in the struts, provide the endurance. Two ECI drives propel the “S-Walk.”

High-powered and quiet

The cooperation came about because Beaulieu was not convinced by a competitor’s drive. “The motor was very loud,” he says. “And it didn’t have the power I wanted.” ebm-papst could help and provided a drive motor for the test. “Even though it had the same compact



Intelligence when transporting equipment on the course and when it comes to its own transportation—the lightweight S-Walk is also easy to pack up.



dimensions, it was much more powerful than the competing product and it could climb steeper slopes,” says Beaulieu. It was also more efficient. And ebm-papst was also able to improve its noise level. Pierre Matje, Head of Sales at ebm-papst Switzerland, explains: “We optimized the planetary gear noise on the standard motor and designed a customized shaft outlet.”

Hit the Green put the improved drive through its paces. It tested the drive on steep uphill and downhill slopes, in rain and heat, loaded with a few clubs and then a lot of clubs. “The ebm-papst motor was the best candidate by far,” says Beaulieu. “We tested another competitor’s product, but it simply wasn’t comparable. During the test, it got burning hot.” On the other hand, no mountain was too high for the ECI. The “S-Walk” also glides across the golf course because it is easy to activate and has excellent control characteristics, gushes Cyril Beaulieu.

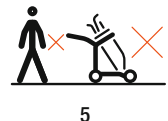
Guaranteed partner

The joint development took about two years. Beaulieu sums things up this way: “It was a lot of fun working with ebm-papst. They always understood quickly what we needed.” Although the new smart trolley from Hit the Green has only been on the market for a little while, he is sure of one thing: “If we develop more trolleys, we will be relying on ebm-papst. That’s 100% certain.” ●



WATCH THE VIDEO:
mag.ebmpapst.com/s-walk

The S-Walk adapts the speed (1), delivers full power on an uphill gradient (2), brakes on a downhill gradient (3), has lateral stability (4), and stops when the golfer stops (5).





Whether in treatment rooms or the waiting room, the Tri-Kleen 500 UV ensures the purest air conditions.



COMPANY
Tri-Dim Filter Corporation

LOCATION
Louisa (VA), USA

The air is pure

U.S. filtration experts from MANN+HUMMEL subsidiary Tri-Dim joined forces with ebm-papst ventilation specialists in the fight against Covid-19. In record-breaking time, they developed the portable Tri-Kleen 500UV vacuum air filter system.

The quality of interior air has been gaining in importance since Covid-19. Yet, the increase in coronavirus infections has meant that demand for solutions that allow efficient and, most importantly, flexible air filtering has grown even faster. Nilesh Tharval, Manager of Advanced Technology at MANN+HUMMEL USA reports: “When the first wave of coronavirus reached the USA, Tri-Dim received numerous inquiries from hospitals, health authorities and medical practices all over the country. We knew we had to supply a really good product quickly.”

No chance for the virus

The core idea: A portable air filter system that generates a vacuum in any closed treatment or examination room to prevent air contaminated with viruses from flowing into adjacent rooms. The Tri-Dim Filter Corporation had its own filtration expertise in-house. With around 800 employees, Tri-Dim is one of the largest air filtration companies in North America and has its headquarters in Louisa, Virginia. Tri-Dim offers an extensive portfolio of products and ser-

vices for heating and air conditioning. These include air and liquid filtration, heating and air conditioning systems, clean room filtration, air purification systems, gas filtration and solutions for measuring and improving interior air quality. Tri-Dim has been a subsidiary of the MANN+HUMMEL Group since 2018.

Two against time

The German parent companies helped to find a suitable partner for the required fan. Mark Pierce, Vice President Sales & Marketing at ebm-papst, Farmington, USA, explains: “The German MANN+HUMMEL and ebm-papst sites already had business connections. The RadiCal centrifugal fan had already been used in other MANN+HUMMEL products. That’s why they were aware of the specifications, and Tri-Dim wanted to have this exact fan.” On a Saturday in March, senior management from both MANN+HUMMEL and ebm-papst US met for the first time on a conference call to discuss the challenge and opportunity before them. In addition to the fan, ebm-papst was also asked to supply

the metal housing of the Tri-Kleen 500UV. The tight time frame given by MANN+HUMMEL was the sticking point. But ebm-papst's team made a great effort by utilizing overtime hours and weekends to supply the first fans along with the metal housings all within a two week period.

A perfect combination

The core components of the air purification system are a MERV 9 prefilter and a cylindrical HEPA (High Efficiency Particulate Air) filter. With help from a micro-glass medium, this high-performance filter guarantees that 99.97 percent of all particles up to 0.3 µm in size are separated. The effect of filtration is amplified by combining the HEPA filter with a UV lamp, whose light destroys germs, bacteria and viruses.

The RadiCal from ebm-papst generates the air flow for the air pressure required in the treatment room. The Tri-Kleen unit has three speed settings and can be operated in "quiet mode." An optional flange can be used to connect a flexible duct, which the system utilizes to discharge a higher air flow out of the room than is fed into it. The negative pressure difference that results from this means that contaminated air cannot escape from the room. Both the intake and exhaust air pass through the filter system.

Flexible and mobile

At first, sheet metal manufacturers at ebm-papst Farmington had to produce the Tri-Kleen 500UV housing by trial and error. Mark Pierce explains: "We were collaborating with Tri-Dim for the first time. We had to establish processes first. We had CAD drawings produced and released, and, despite the enormous time pressure, we quickly managed to deliver what was required because all those involved worked hand in hand."

A step in the right direction

Nilesh Tharval is satisfied: "In the meantime, we have sold almost 1,000 units of the air filter system. More will fol-



"Our promise to our customers is that we will continuously work on innovative, new products and improve existing ones."

NILESH THARVAL

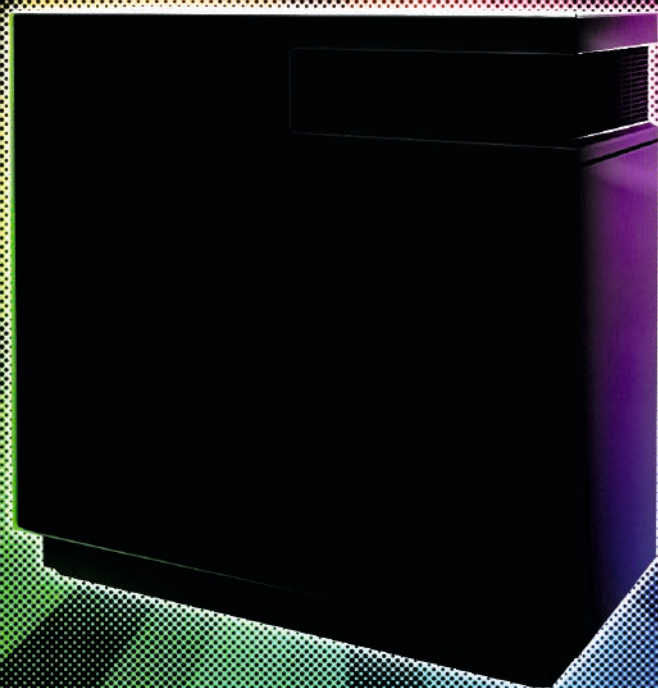
MANAGER ADVANCE TECHNOLOGY
MANN+HUMMEL, USA

low over the course of the year. Feedback from our customers has been entirely positive." The Tri-Kleen 500UV is currently only available on the U.S. market, but there have been initial inquiries from Europe, explains Mark Pierce. "We are preparing to produce 230 volt models with Tri-Dim." Nilesh Tharval adds: "Our promise to our customers is that we will continuously work on innovative, new products and improve existing ones. In ebm-papst, we have found a partner that shares this attitude. For the next generation of Tri-Kleen air filter systems, we are talking about using energy-efficient EC fans. Although we can't stop the Covid-19 virus, we have worked together and harnessed our expertise to curtail it on a small scale." ●

COMPANY
ADS-TEC

LOCATION
**Nürtingen,
Germany**

Magic cube



The HPC Booster StoraXe is a compact energy store, which charges electric cars extremely quickly. The special thing about it is that it takes its power directly from the home electricity network.

It looks rather unremarkable on the outside: A white cube, around 1.20 meters high, standing on a black base. A ventilation grille is recessed on the sides—also in black. The HPC Booster is reminiscent of an over-sized freezer. But under the lid of the 1.8 metric ton cube, there are no deep-frozen oven fries, but 320 kilowatts of concentrated charging power for electric cars. From zero to 80 percent in just a few minutes—this is fast and achieved easily by the HPC Booster and the associated charging station, the HPC Dispenser.

Power from the socket

The topic of e-mobility is advancing more than ever before. The range of electric cars is growing, along with demand. However, there are still too few charging stations in some European countries such as Germany. This is primarily due to high construction costs because most charging stations require access to the medium-voltage network, which involves first digging up roads and laying new power cables. Something which costs a lot of time and money.

However, with the HPC Booster from Nürtingen-based ADS-TEC, expensive expansion of the medium-voltage network is no longer necessary. The white power cube has its own energy storage system, enabling it to be connected directly to the well-developed low-voltage network that we all know from home. From there, the HPC Booster can store and pool energy, and transfer it quickly to a connected electric car via the HPC Dispenser. “In theory, every household can set up its own quick-charge station in this way,” says Jannik Lorenz, PR specialist at ADS-TEC. “The HPC Booster impresses not only with its high performance when charging, but also with its compact design. This makes it unique as a quick-charge station.”

Clever cooling concept

However, high performance also means a lot of energy. And a lot of heat is generated wherever a lot of energy flows. This is no different for the HPC Booster and poses a particular challenge precisely because of its compact design. This is why the quick-charge cube has a clever cooling concept to ensure smooth operation. ADS-TEC also relies on technology from ebm-papst for this. Two EC centrifugal fans from

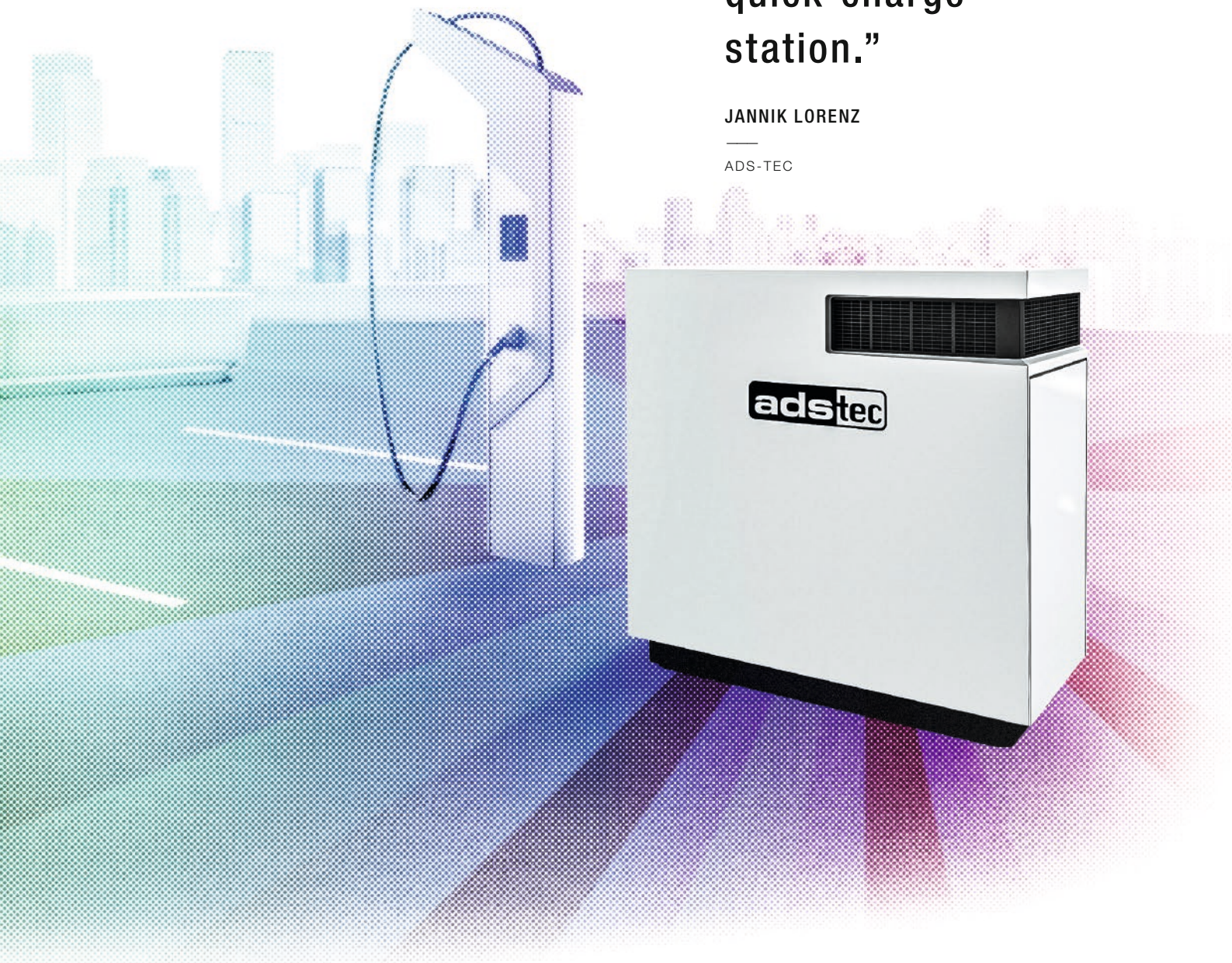
the RadiCal series and a cooling unit ensure that cold air circulates constantly around the lithium battery block in the power cube. Here, the cooling unit extracts heat from the battery block which must be dissipated to the outside. Two more EC centrifugal fans take over this task as condenser fans. This means that the HPC Booster can be operated without any problems at an outdoor temperature of up to 60 degrees Celsius—whilst the inside temperature never rises above 30 degrees Celsius.



“Every household could theoretically set up its own quick-charge station.”

JANNIK LORENZ

ADS-TEC



Under these conditions, the white power cube can deliver top performance and charge around four to seven electric cars one after the other in conjunction with the HPC Dispenser. Here the quick-charge cube continues to draw energy from the low-voltage network and is practically never empty. In addition, another HPC Dispenser can be connected to the quick-charge cube to supply power to two electric cars at the same time. And it does this irrespective of the vehicles' voltages.

This is because the HPC Booster can be used to charge all common electric cars from 200 volts, as well as upcoming models with up to 920 volts, making the power cube the perfect quick-charge station for the future. This was also recognized by a well-known German automotive manufacturer and a large energy supplier, who have invested in ADS-TEC's quick-charge station. We will therefore certainly see the white power cube more often in the coming years at gas stations, car dealerships, and city centers. ●

The efficient and reliable ventilation solution grew RadiPac for RadiPac at Semikron—over the New Year.



COMPANY
Semikron

LOCATION
Nuremberg, Germany

Happy New Ventilation

To enable electronics specialist Semikron to start 2020 with an efficient ventilation system, installation engineering company Kratschmayer put in long hours over New Year — and retrofitted a ventilation system in three days.

F For many people, the time over New Year is a period of calm. For a change, this also applied to the production department of Semikron at the end of 2019. Magnus Stöckl, Head of Supply Technology at Semikron, explains: “Normally we work 365 days a year in three shifts, making it difficult to shut down production for a longer time.” But at the end of December 2019, the time came. And the reason for this: The Nuremberg-based specialist for power electronics wanted to modernize the 20-year-old ventilation system for the six-story main production building. “This period was the only possibility in the year,” says Stöckl. “We couldn’t change over while operations were ongoing, as production needs to have clearly defined climatic conditions.”

The most important parameters are temperature and relative humidity—the latter must be at a constant 45 percent, with a tolerance of just three percent. It is only within this narrow framework that the production staff at Semikron can produce the sensitive electronics parts that are exported to the entire world. Stöckl explains: “Special solder pastes and fitting processes in particular are very sus-

ceptible to excessive humidity or temperatures—then they soon no longer behave as they should.”

More reliability, less energy consumption

Stöckl wanted to achieve three things by retrofitting the ventilation system: “It was especially important for us to have greater reliability in the future rather than using a single large fan, like we had installed until then. We also wanted to reduce energy consumption and install a central dehumidification system in the plant. Until that point, this had happened decentrally on four of the six floors.” Semikron approached ebm-papst when looking for the right partner for the retrofit. The two companies already knew each other, as products from Semikron are also used in production at ebm-papst. The fan specialist referred Semikron to the company Kratschmayer. In the fall of 2019, the three parties jointly organized an on-site inspection. “We first established the basic principles before we decided to find the right fans for the installation situation and the required pressure and



air flow,” recalls Thomas Häberle, Head of the Ventilation Technology department at Kratschmayer and responsible for the project at Semikron.

Axel Resch, ebm-papst Area Manager for Nuremberg, helped find the right fans. “We use both our personal expertise and our own ‘Fanscout’ software, which contains all of our products and experience from many hundreds of projects. This enables us to quickly come up with a useful, customized selection.” In the case of Kratschmayer, the fitting solution was a FanGrid operating with nine efficient RadiPac fans on the intake and exhaust sides respectively. This design enables demand-based control with a high level of redundancy and was a proposal that Semikron also approved of.

Detailed planning for all eventualities

Once the project was clear to everyone, Thomas Häberle made a second on-site appointment to discuss the project’s detailed planning. “Over New Year, you can’t even get a replacement cordless screwdriver,” he says grinning. “That’s why planning is absolutely essential here.” Kratschmayer therefore had all the materials needed delivered to the headquarters in Waldenburg two weeks before the actual retrofit. Häberle also took care of personnel planning well in advance: “Of course it’s something out of the ordinary to work over New Year. But thanks to the long preparation period, we were able to conclude agreements with all employees for this task. The team was also really motivated because it was an exciting project where you could see the results fast.”

The experts from Kratschmayer took the materials for the retrofit to Semikron shortly before Christmas. The employees heaved the fans and the metal plates for the FanGrid frame and other materials onto the roof using a truck-mounted crane. Once everything was set up in Nuremberg for them to install their “gift,” the team first went home to enjoy the festivities. After a few days with their families, they then got down to work. Item one on the agenda on December 27, 2019: removing the old AC fan. With combined muscle power and an overhead traveling crane, Kratschmayer’s employees took the device out of its housing, making room for the much smaller, efficient fans from ebm-papst.

Detailed adaptation on site

“We had of course measured the entire system in advance,” says Häberle. “But we still knew that we would make the exact adjustments to the FanGrid frame on site to ensure that everything really fitted precisely.” In the two days that followed, bit-by-bit the team built the FanGrids on the intake and exhaust side, fitted the fans, and wired them up to the power supply, control cabinet, and control system.

“It was especially important for us to have greater reliability than using a single large fan.”

MAGNUS STÖCKL

—
HEAD OF SUPPLY TECHNOLOGY
AT SEMIKRON

“It paid off that we had a precise schedule,” says Häberle. “Everything went just as we expected, so we were able to complete the upgrade on time.”

When Semikron’s employees started the year on January 1, the team from Kratschmayer had long since gone, but the ventilation system was already reliably supplying the entire production building again: Happy New Ventilation!

Energy savings of 122,000 kilowatt hours per year

Magnus Stöckl feels that the fact that he cannot say very much about the operation of the new ventilation system is a good sign: “We have not heard anything about the system since the retrofit. And that is always positive. What’s more, our time requirements were met exactly, meaning that our production department could start up again without delay.” Semikron also achieved the three goals of the retrofit. Each of the nine fans on both the intake and exhaust sides ensure high reliability and energy consumption dropped by twelve percent. And the decentralized dehumidification system fitted as part of the retrofit now creates climatic conditions throughout the building in which the most sensitive of electronic components can feel at home. ●



DISCOVER THE VIDEO AND MORE DETAILS AT:
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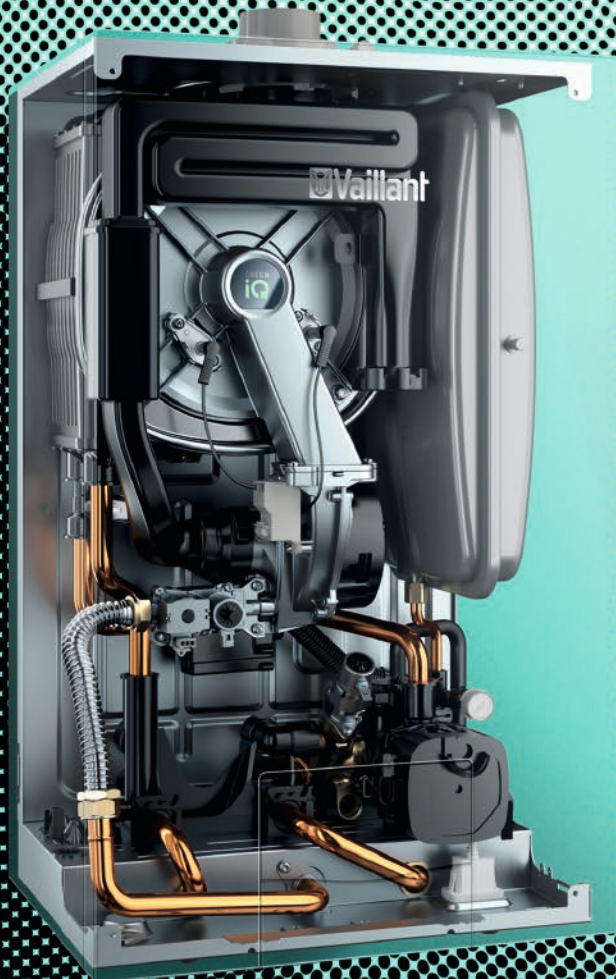
Planning the retrofit included precise on-site adaptation of the FanGrid.



COMPANY
Vaillant Group

LOCATION
Remscheid, Germany

Flexible combustion



The quality of gas for heating varies more and more frequently, meaning that the classic pneumatic mixture control in condensing units reaches its limits. The Vaillant Group therefore relies on an electronic solution in the form of its combustion system IoniDetect.

Until not so long ago, the issue of gas was still simple: For decades, a particular region was supplied from the same gas field. Boiler manufacturers were therefore reliably able to assume a constant gas quality when designing their combustion systems. But the market is changing. Large gas fields, such as in the Netherlands, are drying up and new sources are being tapped. And these are becoming ever more diverse: In addition to natural gas, in the future hydrogen, liquid gas, or biomethane will flow through the pipes.

Sven Schicke, Senior Project Manager at the Vaillant Group, was therefore tasked with making gas condensing boilers fit for this future. He started at the company in Remscheid in Purchasing 23 years ago; today he is responsible for heat cells in Product Development. During his career, he has experienced how condensing boiler technology has replaced conventional heating systems, and is now witnessing another transformation. “We now need appliances that automatically adapt to the different gas qualities,” says Schicke.

From a pneumatic to electronic composite system

So-called pneumatic composite systems consisting of blowers, venturis, and gas valves have been state-of-the-art in condensing boilers so far. The principle: The blower draws in the air, a vacuum is generated by the tapering of the venturi, which controls the gas supply via the valve. When correctly adjusted, this results in the optimum mixture of oxygen and fuel. But if the gas quality changes, the mixture ratio is no longer correct and combustion no longer perfect. “We therefore needed a system that could be used to automatically control the gas-air mixture,” says Schicke. The solution: An electronic composite system. Here, the mixing ratio is not controlled by the vacuum but by electronic control of the gas valve. To ensure that the valve knows how much gas it is to provide, it requires a characteristic value. One that provides information about the quality of combustion in order to be able to make re-adjustments in a targeted way. And where could this data be obtained better than in the flame itself?

Schicke and his team therefore chose a tried-and-tested solution: ionization technology. This utilizes the fact that the flame is electrically conductive. If a voltage is applied, the so-called ionization current can be measured directly in the flame using an electrode. This can be used to draw conclusions about the combustion quality: If the current is too weak, the valve receives the signal to supply more gas; if it is too high, it restricts it. Here, with ebm-papst, Schicke conveniently had a partner at his side who already knew these kinds of systems. “It’s always good to carry out such developments with a supplier who’s already got experience and with whom you have collaborated for many years,” says Schicke. In close cooperation, the development

partners worked out a solution tailored to Vaillant where a gas blower from the RadiMix series and the For gas valve designed for the electronic composite system are used. Vaillant called this new combustion system IoniDetect.

Greater modulation possible

However, it is not just the more precise combustion control that is a major advantage. With the electronic composite system, a higher modulation level can also be achieved. Instead of 1:5, as is normally realized in the pneumatic system, a control range of 1:10 is now possible. “If you just want to wash your hands, you don’t need full power,” says Schicke. The Vaillant Group

gradually wants to expand the IoniDetect technology for all appliances. They have already started with their wall-mounted appliances. Schicke is convinced: “In the long term, the electronic composite systems will replace the pneumatic systems. But it will take some time still before this changeover process is complete. Just like it was with the change from conventional boilers to condensing boilers.” ●

“We now need appliances that automatically adapt to different gas qualities.”

SVEN SCHICKE

SENIOR PROJECT MANAGER,
VAILLANT GROUP

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$$\cos(\alpha_w) = \frac{z_2 \times m \times \cos(\alpha)}{d}$$

A crown gearhead like the EtaCrown impresses with its high level of efficiency. The key to this is the correct angle with which the gear tooth systems interlock.

An important requirement for a transmission is its efficiency. The transmission is supposed to pass on the energy that drives it—as far as possible without losses. After all, high losses mean that more energy is required for the same work.

Gear tooth systems work the most efficiently when the teeth roll against each other as much as possible and only slide slightly.

The key to this is the correct pressure angle of the pinion into the teeth of the crown gear. A crown gearhead consists of a normal spur gear, the pinion, whose teeth mesh in a disk-shaped crown gear. For normal spur gear transmissions, the pressure angle is usually 20 degrees. Here, you can achieve very good meshing and optimum efficiency.

We make use of this proven principle with our EtaCrown, as the pinion is designed with precisely this pressure angle. On the crown gear, on the other hand, the tooth pressure angle changes across the tooth width. Depending on the diameter (d) of the crown gear disk that you consider, there

is a different pressure angle α_w —there is a more acute angle in the inner area of the teeth; towards the outside it becomes considerably larger than the ideal 20 degrees.

However, the gear tooth systems still roll off each other to a large extent. After all, other geometrical variables are also crucial for the optimum pressure angle. These include the number of teeth on the crown gear (z_2) and the correct dimension for the tooth size (m). These variables are constant and perfectly matched for virtually smooth rolling of the gear tooth systems.

This means the crown gearhead, such as the EtaCrown, has an advantage over other transmissions with sliding tooth contact, such as the worm gear: It has lower losses due to friction and is therefore more efficient.

In addition, a crown gearhead is less sensitive and easier to handle than a bevel gear. The reason for this is that, during

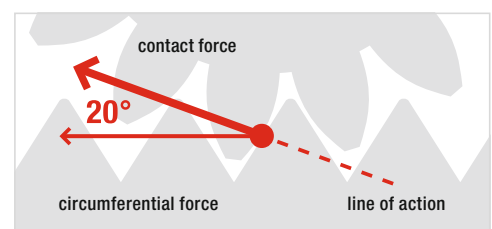


Dr. Nikola Ell and Friedrich Obermeyer — development of technology and methods in industrial drive technology

assembly, the crown gear and pinion only have to be set in two instead of three axial directions for the perfect pressure angle. ●



The point of contact between two tooth flanks moves throughout the entire meshing process on a straight line, the line of action. The angle by which the line of action is inclined is known as the pressure angle; it is usually 20 degrees.



Automation to get there faster

A motor passes through several optimization loops until it meets the required specifications. This used to cost a lot of time. Today, programs automate the work processes during development. And customers get a better product faster.

High power density, low losses, and very dynamic behavior—these were the requirements that a customer in the automotive industry placed on the electronically commutated external rotor motor for their exhaust aftertreatment pump system. “Our standard motor was not designed for this,” says Frank Jeske, Head of Motor and System Development at ebm-papst in St. Georgen. “A few modifications to the motor were required for the application.”

In the past, for development projects like this, ebm-papst used to work simultaneously with different software tools which came closer and closer to the solution in repeated calculation runs. Using this, the engineers designed a preliminary version and built the first samples on this basis. They tested them, changed parameters, and developed new preliminary versions and samples until the motor met the desired requirements at some point. “The motor underwent various optimization loops,” explains Jeske. “That cost a lot of time and money.” So the motor working group at ebm-papst started looking for better development methods.

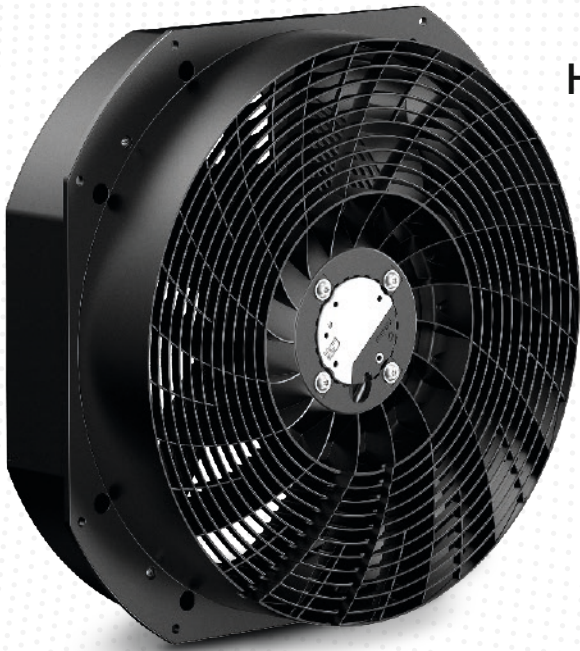
The St. Georgen site found the solution for industrial and automotive applications in the SyMSpace system developed by the Linz Center of Mechatronics.

The program can independently control third-party software such as CAD, finite element solvers, and dynamic simulation tools remotely, thus combining all the necessary tools in one program. “Now we create models and tell the program which parameters these should be optimized for—for example for minimum losses. It then does the calculations itself—for example over the weekend—and if everything works out, we can already create samples on Monday,” says Jeske.

As a result, the customer receives reliable intermediate results faster, making adaptations easier and ultimately creating a better product. This is because the calculated optimum is more accurate than getting closer to the requirements using sample loops, provided that the models reflect reality to a precise enough extent. “The major advantage is that the program’s knowledge grows. If we have a follow-up project, we can use the data and experience gained from this project and reuse parts. This means we reach our goal faster.” ●



FIND OUT WHICH OTHER PROJECTS EBM-PAPST IS WORKING ON WITH THE LCM: mag.ebmpapst.com/LCM



HIGH PERFORMER

At the beginning of 2020, the AxiEco Protect opened the door for axial fans in ventilation and air conditioning applications where a high pressure increase is required. The new AxiEco Perform increases pressure stability and efficiency even more—and is also available in an easy-to-install housing made from high-quality composite material. ebmpapst.com/axieco



SMART GAS

The highly efficient VG 130 gas blower was specially designed for the HRX generation of condensing boilers from Intergas. It is controlled by a newly developed electronics system that, in combination with the Comfort Touch thermostat, makes it possible to access the boiler from your smartphone.



INCREDIBLE POWER

The small RVE45 centrifugal fan is the ideal solution for applications requiring dynamic air delivery and high pressures, such as vacuum lifters or packaging technology. You should not underestimate the lightweight, quiet, and small fan—it easily generates 5,000 pascals! ebmpapst.com/RVE45

“The system will soon be H₂-ready”

What are the challenges when you want to make gas appliances ready for hydrogen?

There are three main aspects here. Hydrogen is the lightest of all chemical elements with the lowest density. It permeates elastomers and plastics more easily than natural gas. This means the components in condensing boilers must have a higher density. In addition, the compatibility of the materials must be ensured.

And the third aspect?

The combustion behavior requires special attention as the flame speed is eight times higher than with methane. The ignition parameters in the combustion controller must be adapted to this. And because of the different calorific value and Wobbe index, the gas-air regulator must be designed to achieve optimum mixing and combustion that is as clean as possible. The normal flame monitoring using the ionization current is also not suitable for 100 percent hydrogen. Alternatives include the tried-and-tested temperature measuring methods combined with state-of-the-art microelectronics.

How far is ebm-papst in the process?

Our established NRV118 composite system is already designed for a hydrogen content of up to ten percent without any changes. In several investigations and field tests, we have shown that the system will be H₂-ready with a few

Hydrogen could be the clean future of the heating technology sector.



Jürgen Schwalme, Head of Application Regions & Certification at ebm-papst Landshut, provides information about the right gas-air composite systems.

changes —so it can be adapted to use with 100 percent hydrogen. Tests on temperature monitoring are currently promising.

What changes are these?

We have increased the requirements for the tightness of the gas valve and blower, and have tested and adapted the materials used. The HS0118E1 Hydrogen compensates for the disadvantage of lower Wobbe index and calorific value, along with increased burner pressure loss. It does this using a special pre-mixing device to mix the gas and air upstream of the fan. Furthermore, higher modulations can be run because the gas valve can be optimally controlled by negative pressure.

What happens next?

Until the 100 percent hydrogen target has been reached, we will work with an increasing proportion of addition. At our development center in Osnabrück, we are working on suitable blowers and combustion control systems that ensure clean combustion even for changing mixture ratios. They will thereby increase the efficiency of the system and contribute to meeting the climate targets. ●



FIND MORE INFORMATION IN THE TECHNICAL ARTICLE:
mag.ebmpapst.com/hydrogen

The flame speed of
hydrogen is

8x

higher than that
of methane.

lightweight

Hydrogen is the lightest of all chemical elements
and permeates many materials more easily than natural gas.



10%

The HS0118E1 already manages this hydrogen
content in the gas mixture — without any changes.

WOULD YOU HAVE RECOGNIZED IT? — THE HS0118E1 HYDROGEN FOR CLEAN HEATING. TAKE A LOOK INSIDE! ↑