The customers' magazine

mag°

all about ebm-papst

02 ° 2011

Country airing

High-tech climatization in the agricultural sector

ebmpapst

Your trust is our obligation!

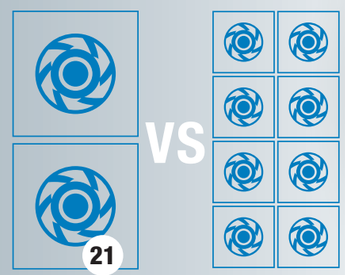
Thomas Borst
Managing Director
Sales and Marketing
ebm-papst Group

Dear Readers, on 31st March of this year, ebm-papst wrapped up the most successful fiscal year in its history. For this, we extend heartfelt thanks to you, our many thousands of large and small customers from the most varied industries around the globe. Without your confidence in our company and without the many joint projects, our growth would not have been possible. Of course, along with our over 11,000 employees around the world, we are very proud of this exceptional level of success.

We are also aware of the responsibilities and obligations that our growth and size incur. Our strong roots and corporate philosophy – which now as before bears the stamp of the founding families – keep us down to earth. Size is not valuable on its own unless it serves a greater purpose and thus creates new kinds of value for our customers.

This purpose includes, for example, our expertise in providing solutions, which we continue to work on day after day. In this area, economic size can be a positive force and provide its full benefits. For example, we spent over 61 million EUR on research and development in 2010. Along with our in-depth experience and insight into a wide variety of industries and markets, this creates the fertile ground for new solutions born of developments in partnership between you and us. These solutions are intended to help you, our customers, become even stronger and more successful in your markets.

In this spirit, we look forward to continued co-operation and many shared successes!



02°2011 mag

360°

Fans at the testing site in Arizona

Climate changers

Fans withstand endurance tests in three different climate zones

Seven HyBlade® fans rotate in Siberia's ice-cold climate. Another seven are in the dry and UV-intensive desert climes of Phoenix, Arizona. A third group of fans is exposed to the warm and moist tropical air of Singapore. At these three testing locations, ebm-papst subjects the energy-efficient axial fans to the most extreme climatic conditions. The fans run cyclically to come as close as possible to a real scenario. Use of various GreenTech EC fans as well as various material combinations ensures reliable test results. Technicians use remote monitoring to call up current measurement data such as temperature, humidity and speed. Live images are also available via Internet. Three years into the test phase, the interim results show that the fans withstand the various climatic stresses effortlessly.

Which products lead into the future, Dr Lindl?

Dr Bruno Lindl, ebm-papst Group Managing Director of Research and Development, on the materials of tomorrow

What tasks does research and development have at ebm-papst?

The first priority is expanding our competitive technological leadership worldwide: in basic development, we create the basis for new products and innovations, while application development comes up with market-specific and customer-specific solutions. With some 600 highly skilled employees worldwide and state-of-the-art laboratory facilities, we are able to develop marketable products that are ready for the future in the areas of aerodynamics, drive engineering and electronics.

How does the GreenTech philosophy influence your objectives?

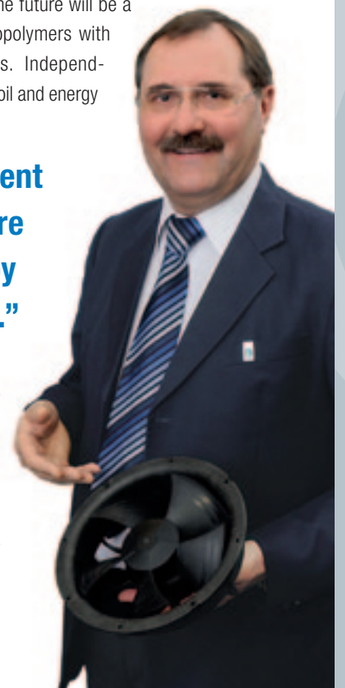
The comprehensive view in terms of energy is the critical factor for us, and energy-efficient operation is only a means to that end. Even in the concept phase, ensuring that production conserves resources is firmly entrenched. In addition to technical marginal conditions such as "form, fit, function" and economic aspects such as target costing and time to market, the entire life cycle is evaluated from an environmental perspective and taken into account in the product design. Moreover, we have set a very special goal for ourselves: by 2015, 15 percent of the plastics now used are to be replaced by sustainable materials.

Concretely speaking, what does this mean for the product range?

Since 2008, we have been mass-producing our HyBlade® hybrid concept for large axial fans made of a polypropylene-based composite material with aluminium structure. We have now been able find a substitute that allows us to omit the aluminium – which is very energy-intensive to manufacture – entirely and lower the energy input from 33 kWh to about 10 kWh per fan blade. In line with this concept, we are now using composite materials on a large scale in our RadiCal® centrifugal series and for customer-specific installation modules.

In our materials laboratories, efforts were directed towards replacing the mineral-based fillers with renewable materials. The focus: wood-based fillers. Intensive studies and tests have showed that the product characteristics are completely comparable. The energy savings for producing the fibreglass content in the filler and reducing the plastic content together mean that this concept saves about a million litres of crude oil. The material of the future will be a composite of biopolymers with renewable fillers. Independence from crude oil and energy savings in materials manufacturing will become important parameters for the future viability of companies.

"By 2015, 15 per cent of the plastics used are to be replaced by sustainable materials."



News in brief

For the second time since 2009, ebm-papst and its lead agency wob have won the GWA Profi Award. The distinction honours the "GreenTech" communication strategy, which has positioned ebm-papst as a green company.

The GreenTech campaign was also distinguished in the United Kingdom: ebm-papst UK Ltd received the ACR News Award for the best marketing initiative of the year – for the second time since 2007.

In addition, the British Federation of Environmental Trade Associations (FETA) has appointed Geoff Lockwood, Technical Director at ebm-papst UK Ltd, as its President. The Federation represents the interests of manufacturers, sub-suppliers and installation engineers from the refrigeration and air-conditioning technology industries on the British Isles.

ebm-papst is a prize winner in the 365 Landmarks in the Land of Ideas competition for the third time in a row. In July, Minister President of Baden-Württemberg Winfried Kretschmann presented the award for the energy-saving RadiCal® series of centrifugal fans.

Tolerance is a basic requirement for working together successfully. To express this message, ebm-papst Landshut is participating in the Respekt! Kein Platz für Rassismus (Respect! No room for racism) campaign. After all, colleagues from some 19 nations, with an extremely wide variety of religious beliefs, work at the location.

In the 16th ebm-papst Marathon, held on 11 September in Niedernhall, a total of 3,441 participants ran in eleven races. 3,378 runners made it to the finish line.

On 6th and 7th January 2012, Mulfingen is hosting the 10th ebm-papst Hallenmasters (indoor football championships). On the first day, twelve amateur teams from the region will compete, including last year's winner FSV Hollenbach. On the second day, ten German national league teams, such as reigning champion Borussia Dortmund, VfB Stuttgart and TSG 1899 Hoffenheim, will send their A-Juniors for a like-for-like comparison.

Learning to assess situations better: at the kids' traffic training in Mulfingen

Kids at the wheel

ebm-papst supports traffic training for youngsters

Children generally find it hard to understand the rules of the road. During the summer holidays, however, a program in Mulfingen gives them the opportunity to take a turn behind the wheel and experience traffic from the perspective of a grown-up driver. This year, 55 kids from ages 7 to 13 drove laps around the practice course, which was complete with real traffic signs, stoplights and zebra crossings organised by the municipal government in co-operation with a service provider. At speeds up to 12 kilometres per hour, they drove small vehicles sponsored by ebm-papst and other regional companies. The objective of the annual training is to give the young people a feel for the speed, braking and swerving characteristics of cars so that they can better assess everyday situations.

Driving force

Second environmental technology award for ebm-papst

The RadiCal® earned ebm-papst the Baden-Württemberg Environmental Technology Award. The centrifugal fans in GreenTech EC technology were recognised in the energy efficiency category. Even today, they exceed the legal ErP Directives regarding efficiency which are soon to come into force. This persuaded the panel of experts and Minister of the Environment Franz Untersteller. "Today, environmental technology is becoming a driving force for the economy. We want the award to make a clear statement by featuring companies whose innovations are particularly energy-saving and environmentally friendly." In 2009, ebm-papst had already won this distinction from the federal state with the innovative HyBlade® axial fans.

Franz Untersteller presents the award to Dr Bruno Lindl and Gunter Streng (from left)

Insights at the training information day

Job prospects

Training information day at ebm-papst

In July and September, a large group of teenagers attended the training information days held in Mulfingen and Landshut. Information stands, tours of the production facilities, presentations of trainee projects and special programs in the training workshop allowed the visitors to learn about the possibilities for training and study offered by ebm-papst. The most noteworthy aspect of the event: trainees organised the information day and carried it out themselves. Thus students had an opportunity to get answers about everyday training and prospects firsthand from young people not much older than themselves. “We wanted to give the prospective trainees the ability to come to us directly with their questions,” trainee Philipp Schmeisser explains. “This has worked very well.”

ebm-papst’s locations are also responding to the challenge of twice as many secondary school graduates in 2012: since Year 13 in the college preparatory school is being eliminated after this school year, students completing Years 12 and 13 will graduate together. Therefore, Mulfingen is increasing its number of training and study positions for graduates from 12 to 24. Thus a total of 60 apprenticeship training positions will be available for the start of training in 2012, 18 in St. Georgen, 8 in Herbolzheim and 14 in Landshut.

200 percent China

ebm-papst expands its location in Shanghai

ebm-papst has added seven new halls to its subsidiary in Shanghai, thus doubling the facility’s space. The expansion of the capacity by some 18,000 square metres is an expression of the growing importance of the Asian market: last year, turnover in Asia was up more than 50 percent. The plant expansion also documents the entry into the growth market of the Asian automotive industry. “Production in the new buildings will focus on drive motors, compact fans and GreenTech EC fans,” explains Thomas Wagner, Managing Director – Production and Materials Management, who is also responsible for the 1,300 or so employees in Shanghai.

In addition to the Sales and Production departments, ebm-papst supports its local customers with 30 engineers in development to make optimising fans for specific real-world applications even faster and more efficient. “We are present where our customers are,” emphasises Wagner.

Tour through the new production facility in Shanghai

Using the sun’s energy

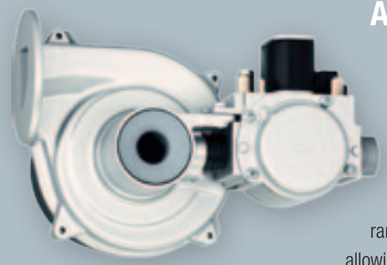
ebm-papst USA makes use of photovoltaics

At ebm-papst, environmentally responsible actions are a manner of course. Accordingly, the US subsidiary in Farmington, Connecticut has built a photovoltaic system on the roof of its facility. It has been online since mid-June of this year. The energy is fed directly to the central circuit for the technology centre and the production hall, and can provide a peak output of 50 kilowatts. This energy is sufficient to provide all of the electricity required by the offices in the technology centre. The panels consist of Schüco MPE modules, and the Satcon PowerGate inverter incorporates ebm-papst fans.

Solar panels on the roof of the subsidiary in Farmington

For more information please go to: www.ebmpapst.com/product-news

IT’S A NEW CLASS By using biomaterials in fans, ebm-papst points the way towards the future: the wood in the housing not only saves resources and comes from sustainably managed domestic forests, but its good damping characteristics improve noise behaviour as well.



BURNERS PROVIDE ADDED VALUE

The new NRV 77 centrifugal blower with Venturi nozzle and pneumatic gas valve uses up to six percent less energy, has a more compact design and better controllability thanks to a speed range of up to 12,000 rpm – allowing the gas condensing boiler to save even more energy.

TAKES A LICKING The new 630 series was developed for applications in tough ambient conditions in telecommunications or solar inverters. The compact fan fulfils salt spray protection requirements to Bellcore II, is classified as IP68 – and has up to 15 percent better efficiency.

Bring on the water! For cooling in the automobile, the new electronic water pump provides maximum heat dissipation with minimum consumption. With its optimised hydrodynamic design, the 20-watt pump has an overall efficiency of 35 percent and attains an operating pressure up to 50 percent higher than comparable pumps.

COMPACT EFFICIENCY and a long service life are the outstanding features of the new i-maxx W1G130 with fully integrated electronics. This makes it the ideal solution for demanding industrial applications in control cabinet and inverter cooling or refrigeration technology.

Keep on truckin’

A new generation of GreenTech EC axial fans optimises climate control systems in commercial vehicles: they are flatter, quieter, lighter, feature enhanced function and prevent overtemperature shutoffs thanks to their power derating system.

www.greentech.info

The applications of fans range from fruit storage to poultry farming …

A tough job in agriculture

A wide variety of ventilation, air-conditioning and drive technologies are used in the agricultural sector. They must perform well while consuming the least possible energy

… and there are many in the tractor as well

High-tech on the farm? This may not fit our idyllic notions of a small agricultural operation. Nevertheless, today's farmer makes use of satellite-guided tractors in the fields, fully automated milking machines for milk production, electronic ovulation monitors in the pig farm – and energy-efficient ventilation and air-conditioning in the barn. This helps not only to better cope with the all-important everyday factor of the weather, but also to save costs in the process – while also protecting the environment.

Barn climate control To succeed in animal husbandry, fattening and dairy production in different regions and in every season on a large scale, farmers make use of sophisticated barn climate control systems. In addition to the extremely diverse legal requirements regarding the size and type of assignment of the barns, each country has preferred architectures and different systems for each species, which have to be modified according to the stocking – the number of animals per square meter.

Cows can handle colder temperatures well. Therefore, their barns are usually outfitted with free ventilation in which the wind enters through openings in the wall and escapes via a chimney or flue in the roof due to thermal lift. Only on extremely hot summer days when the air does not move at all are "Cow Coolers" used, which are fans installed on the ceiling that provide circulation.

Poultry farmers use tunnel ventilation for fattening and egg production. In these systems, fans located on one front side of the barn suck the air from one side to the other through the barn. The fans have flaps installed that serve as an intake. In hot countries, these flaps are fitted with humidifiers that cool off the air. The system requires uniform flow of air through the barn. Axial fans are primarily used in this application.

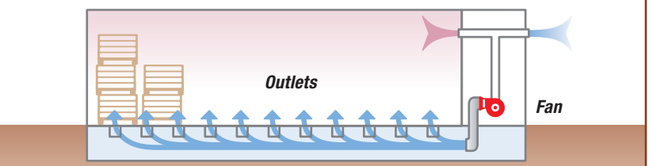
Centrifugal fans are also used in special applications, such as drying chicken manure. In large chicken barns, the manure is evacuated, dried and used as fertiliser. Along with a large company of the agricultural production industry, ebm-papst has implemented a system of this type with energy saving fans.

For pig breeding and fattening the tasks are similarly demanding. For one, a controlled climate has a great effect on the well-being and performance of the sensitive animals. For another, substances that damage the building and health – known as room loads – must be discharged. Particularly stringent requirements exist for fresh air supply in heavily stocked barns. In summer, the ventilation must protect the animals

GreenTech EC technology allows the farmer to have better control over costs and the effects of the weather

Shelf life of the potatoes doubled, energy consumption cut in half

Cross section of a potato warehouse: fans blow fresh air through a duct to the oulets



from heat stress; in the winter, it must prevent condensation and excessive quantities of ammonia, hydrogen sulphide and carbon dioxide in the air – while heating up the room air.

For pig farmers, what is called compartment ventilation is the ideal solution. In these systems, fans provide exhaust for individual sections of the barn via a chimney or flue. For this purpose, decentralised solutions exist in which the fans are distributed over the entire barn. In the centralised solution, fan groups are located in a pressure chamber and draw the exhaust air from the barn via ducts in the floor or ceiling.

Additionally, air purification via filter systems is possible. This is used primarily by animal husbandry operations on the outskirts of town to keep unwanted odours for nearby residents to a minimum. Especially for this purpose, ebm-papst offers both the low-pressure versions of the fans, which are ideally suited for chimney and tunnel exhaust, and more high-performance fans that are used in these downstream purification systems. In these systems, the air is pushed through chopped biomass, bark or special granular material to absorb part of the odour.

Pig farming operations now also use exhaust systems that work with heat recovery, which are common in building ventilation systems. In doing so, the outflow of air gives off its heat to the inflowing air in cooler regions or in winter. This saves heating costs for the operation. Depending on the size and the configured minimum air rate, the animals cannot warm up the room with their own heat; additional heating is required. This is usually gas heating – which incurs corresponding costs.

Saving energy therefore is becoming increasingly important in agriculture. One factor is the EU fan directive that is taking effect. The agricultural fans in common use today – even in new buildings – are mostly voltage-controlled, consume a large amount of electricity and thus are inefficient. On the other hand, farmers are subject to increasing cost pressure, and GreenTech EC fans pay for themselves relatively quickly. Compared to conventional systems, enormous energy savings are possible over the course of the year.

Søren Pedersen's farm is a good example of this. The pig farmer from Bjerringbro, Denmark, had initially switched to GreenTech EC fans in one barn. After just one month, a direct comparison with another barn that is still being ventilated with conventional fans showed up to 70 percent less energy consumption. Therefore, Pedersen is now converting all his pig barns. This investment will have paid off for him in three years. The barn ventilation is a real endurance test for the fans. In most of these applications, the output of the fans must be controlled with high accuracy, whether it be via temperature, humidity, carbon dioxide content or more than one of these parameters at once. EC technology has a significant advantage for demand-oriented air supply due to its integrated, highly accurate control and high efficiency, particularly in the partial load range. Therefore, it is ideal for use in each of the application areas – and pays for itself quickly. →

Charge air cooler in the John Deere 5030 series

Fresh air for tractors

An axial fan rotates under the hood in the charge air cooler of the John Deere 5030 tractor series. Thus it helps to increase the output and efficiency of the engine.

In the same Deere series and the Fendt 900 series, a twin centrifugal fan in the cab air-conditioning system ensures pleasant working temperatures.

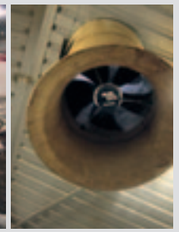
Best air-conditioning for cabs in the Fendt 900 series

ebm-papst in agriculture

Pigs, chickens, potatoes, tractors: in a wide variety of applications in state-of-the-art agricultural operations, ebm-papst GreenTech EC fans are already in use today

Ventilation and drying for poultry

In ventilation systems of a poultry farm in Denmark, GreenTech EC fans reduce power consumption substantially. Moreover, fans provide fast and efficient ventilation in a manure drying plant.



Well ventilated poultry farm in Denmark

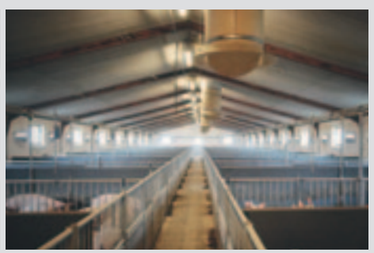
Sales engineer Alexey Vinnik of ebm-papst Belarus visits the completely renovated potato warehouse

Keeping potatoes fresh

Belarus-based AgroMaster produces ventilation systems for vegetable warehouses in the ex-Soviet countries. The GreenTech EC fans now in use meter the air volume precisely. This means that a potato warehouse, for example, uses half as much energy – while doubling the shelf life of the potatoes.

Ventilation for pigs

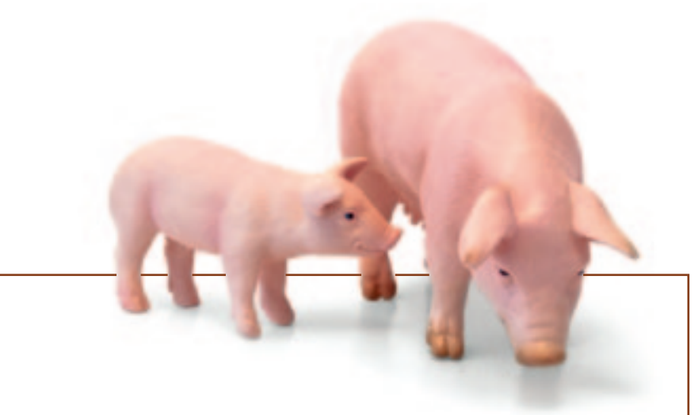
The new GreenTech EC fans in Søren Pedersen's pig barns not only save up to 70 percent in electricity, but also save time when loading the animals. The exact controllability makes it possible to reverse the flow direction and thus to create a controlled draught in the barn. To escape the draught, the swine walk right into the lorry with no trouble.

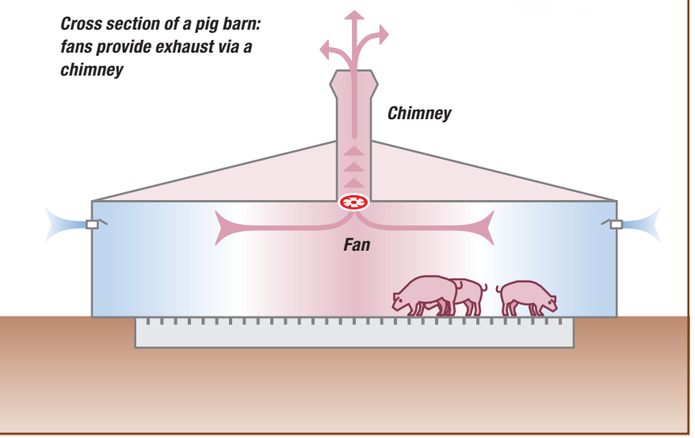


Søren Pedersen checks the savings at the meters of the ventilation system of his pig barns

The fans are also meeting another challenge: they withstand environmental stresses from aggressive substances and influences such as scraped-off bristles, skin parts and feed dust. For this purpose, ebm-papst engineers have worked with the customer to ensure specially sealed bearings, corrosion protection of the metallic parts, use of stainless steel as a reinforcing material and additional protection of the motor.

The pigs enjoy fresh air, the farmer enjoys reduced costs





Cross section of a pig barn: fans provide exhaust via a chimney

Storage Fans are also used in storing fruit and vegetables. Apple warehouses are a good example of particularly complex air-conditioning of facilities in which fruit is stored. The fruits are kept from perishing for an entire year by storing them close to the freezing point, with a maximum difference of plus/minus one degree. In addition, CO_2 is injected into the air. These measures prevent the spoilage process.

Storing potatoes is a bit simpler: the tuber rests in bulk on a lattice for six to eight months and is enveloped by an air flow to keep the temperature fluctuation over the course of day within a range of 0.5 degrees Celsius. This slows down the loss of moisture and thus the loss of quality. ebm-papst implements solutions of this type with Belarus-based AgroMaster. The air volume in the plant is metered with precision using sensors, software and GreenTech EC fans. Compared to the outdated standard in the ex-Soviet countries, the state-of-the-art plant not only increases the shelf life of the vegetable by some 45 percent, but also lowers energy consumption by one-half at the same time.

Tractor ebm-papst fans are also used outside buildings. So that a tractor has enough power even in heavy soil and on slopes, suppliers use engines with charge air cooling that increases the output and efficiency. In the new models from John Deere, the charge air coolers have an extremely flat axial fan mounted on the top, which was originally used in bus climate control systems. A couple of adaptations were required for the application in the tractor: for example, the emergency stop shuts down everything – including the cooling. However, the heated charge air cooler still radiates heat. Therefore, the specially selected material of the wall ring withstands temperatures as high as 130 degrees Celsius without deformation. In addition, the Mulfingen-based team modified its shape so that the fan develops both an axial and a centrifugal air flow and thus cools down the heated charge air cooler even more efficiently. The control system also has the additional "reversing the direction of rotation" feature, which allows it to purge the radiator grille of the charge air cooler clean of dirt.

The fan in the cab air-conditioning systems of Fendt and John Deere also has to withstand quite a bit: vibration, shock, dust and large temperature differences are a part of everyday life. All of this is intended to ensure that even in searing heat, the farmer can work on the field without suffering due to the weather. ○

In the spotlight

The products from Robe put every event in the right light. The Czech company is using fans from ebm-papst for its state-of-the-art product generation

The music starts up and the people rave. But what would a concert be without the attendant light show? Spotlights shine with all kinds of brash colours, perform sophisticated light choreography and cast spectacular images onto the wall. Light show specialists can do all of this and more with the movable lamps and other lighting products from Czech manufacturer Robe. The products have now gained a home worldwide: at trade fairs, on concert stages and even in television shows such as Germany's reality talent show "Deutschland sucht den Superstar", the local version of "Pop Idol". "With its many new developments each year, this market is naturally very promising," describes Aleš Jakubec, Managing Director of ebm-papst Czech for the lighting sector. "That is precisely what makes it interesting for us as well. For that reason, it was very important for us to gain Robe as a customer."

Persuasive performance Contact with Robe arose in 2005 when the company was searching for some useable fan for the LightDome system. This outdoor lamp is surrounded by a weatherproof plastic foil. To prevent the foil from coming into direct contact with the hot lamp, it is kept under pressure by a fan. Robe wanted to work with an axial fan, but Jakubec analysed the application and suggested using a centrifugal fan. At first Robe's developers were still a little sceptical as to whether these AC fans would meet their requirements. "Not only must they be high-performance and work without failing, they also must not negatively impact the function of the sensitive spotlight electronics," explains Jakubec. "This is why Robe subjected some samples to rigourous testing." Above all, the G2E140 scored points by operating quietly with a minimum of vibrations. Moreover, the fan won out because it is easy to integrate (and control), has a low overall height and is manufactured from a lightweight material similar to that of the lamps.

Since then, other DC compact fans have proven themselves in these applications, primarily for cooling LED lamps in a wide variety of various spotlights. Ales Jakubec is satisfied: "We reckon that the lighting sector will grow into one of our most important business areas in the next years." ○

Even the Pussycat Dolls show doesn't make the lamps from Robe overheat

The breaks during the presentations (top right) and after the lecture by Prof Weizsäcker (bottom right) provided attendees the opportunity to interact with Managing Directors and competitors (left)

“We offer the forum for forward-looking technologies”

In May, ebm-papst organised what has now become the fourth Innovation Forum under the title “Future Efficiency” industrial technology, air-conditioning and refrigeration technology and heat pump technology. Twenty subject specialists from customers, colleges and universities and the company itself presented on and discussed this for two days with the more than 200 participants. The people responsible for the biannual event, Dr Bruno Lindl, Managing Director for Research and Development of the ebm-papst Group, and Alfred Müller, Sales Manager Germany, provide information about its results and background

How do things look for the future of efficiency?
Lindl: Competitive products that conserve resources are the basis for the future sustainability of companies. That is why the essential parameter for successful innovations in the coming ten years is energy efficiency. That is one part which the companies contribute for achieving climate goals.

Have customers now become more receptive to “green” messages?
Lindl: It is not just a question of “green”. End customers expect not only a functional and cost-effective product, but also one that can reduce operating costs. That is the task of the entire supplier chain. More and more, lifetime costs are slipping into the foreground of efficiency and cost evaluation. This is also a substantial reason for the success of energy-efficient products.

What role does the Innovation Forum play in this?
Müller: Among the numerous customers from our industries of industrial technology, air-conditioning and refrigeration technology and heat pump technology, many were important development managers for us, who significantly determine the product development of their houses. Thus the Forum picks up right where the products with our forward-looking technology have their origin.
Lindl: Here, we make it possible to present and discuss innovations along the entire value creation chain, all the way to the benefits for the end customer. This forum serves as a platform and catalyst for discussing the requirements and options for marketable products of tomorrow.

What should the customers take away from this?
Müller: It is enormously important for us to present our forward-looking technology for external institutions and ways to implement them directly with the industry’s reference customers. That is the focal point of the event. Additionally, consumers and competitors of our reference customers come to the Forum because here they can learn about implementation and new trends of their industries. Accordingly, the breaks were filled with intensive discussions and animated exchanges of information between specialists and executive staff of the companies. It is possible to have personal discussions among experts at the Innovation Forum. Moreover, here customers have the opportunity to speak directly with the management and ebm-papst developers. In addition, of course, it is also a social event in a beautiful setting that strengthens customer loyalty.

What benefit does ebm-papst draw from the event?
Lindl: We have to work jointly with our customers to find the best technology at marketable prices, in order to offer our end customers the greatest possible benefit together. When generating product ideas, the most important challenge is to address the future desires of customers and to optimise the customer benefits qualitatively and quantitatively.

This succeeds only when there is close networking among developers of components, subsystems and end products. In terms of progress, more latent potential exists here than in endless value analysis reflections focused on single components. And at the Forum, we attempt to establish this comprehensive approach.

“End customers expect a competitive product that can reduce operating costs.” **Dr Bruno Lindl**

Has the event already produced synergies?
Müller: The Forum presents not only our own basic and future developments, but also how to successfully implement applications with reference customers. In any case, with imminent standards, such as the Energy-related Products Directive, we achieve the greatest success through close co-operation. This was confirmed by the presentations from customers on existing and future market demands as well as research results presented by professors from colleges, universities and other institutions. Only by working jointly to persuade end customers have we and our OEM customers succeeded in placing over one million energy-saving motors in refrigerated counters and refrigeration systems in the past three years.

What were the high points for you?
Lindl: Certainly the presentation by Professor Ernst Ulrich von Weizsäcker on the evening before the Forum. He vividly portrayed the relationships between society, politics, economy and technology – and the scenarios to be derived from these. He emphasised that the next technology cycle will have to focus on energy efficiency and resource conservation. And in the evening program on the second day, for the third time in a row we received the distinction “365 Landmarks in the Land of Ideas”, overseen by Federal President Christian Wulff.

How would you sum up the fourth Innovation Forum?
Müller: It was an outstanding event. Our clear focus on innovative efficient products has been confirmed. Now, together with our customers, we have to open up new markets and expand the ones that exist. Only energy efficiency will enable us to master the future with renewable energies! The greatest growth potential for all of us appears particularly in this area and with the energy-related upgrading of existing building materials. Our great sales success in the past fiscal year, also confirmed for our customers that they relied on the right partner with us.

How will the Forum continue?
Lindl: We will certainly schedule another Innovation Forum in Mulfingen in two years and invite our customers even today to present forward-looking technologies with us as well as how to implement them. We will again select two to three areas from our eight main industries. This way we will ensure concentrated, joint work on both days – along with highly competent and interesting representatives from science and research. ○

“Only energy efficiency will enable us to master the future with renewable energies!” **Alfred Müller**

Dr Bruno Lindl
Managing Director
Research and Development
ebm-papst Group

Alfred Müller
Sales Manager Germany
ebm-papst Mulfingen
GmbH & Co. KG

Gerhard Selmer, Key Account Manager at ebm-papst in Landshut, with the gas-air-module

Heat from a single source

A complete gas-air module from ebm-papst helps make a Remeha condensing boiler for private households even more affordable

Enjoying comfortable warmth in a home with central heating with a clear conscience, despite the ever-rising natural gas prices and emissions. Remeha wants to make this dream come true for even more end customers. Remeha has taken up the cause of cost-effective, groundbreaking technology and has been specialising for over 30 years as one of the leading suppliers in the field of gas condensing boilers. For that reason, in 2012 the heating specialist will bring to market a cost-effective, compact condensing boiler for private households: the device is called Tzerra. The new boiler should be attractive above all for customers in countries where, to date, conventional heating systems have been more likely to be implemented for cost reasons. Tzerra is particularly space-saving, ultralight with only 17 kilograms and represents a new technical development.

The core point of the innovation is the design's use of a modular system. The entire device consists of only four modules, which are assembled at Remeha: a housing and frame, a heat exchanger and burner, a gas-air unit with a burner controller and hydraulic components with a recirculating pump. For the development and construction of the gas-air unit, Remeha charged ebm-papst with the task of combining all the parts in a single, ready-to-install set.

In Landshut, the entire gas-air module is designed, developed and built as a unit for the first time for the Tzerra boiler. According to the requirements specification, it is to assume total control of the boiler and deliver the air-gas mixture to the burner. The solution includes the following parts: mixing adapter, blower, gas-air ratio controller – what is called the venturi nozzle – gas valve, intake noise filter, boiler control system, safety component and ignition transformer.

The core point of the innovation is the design's use of a modular system

As an innovation, ebm-papst designed the gas-air module as a compact, integrated complete system, which includes the blower, gas valve, burner controller, mixing adapter and the electronics for the burner controller and blower combined on one board. "The objective was to save space, while simultaneously developing a simplified plug-and-play method for assembly and maintenance," explains Gerhard Selmer, Key Account Manager for Remeha in Landshut. "Both help reduce the costs for the device significantly." The complete system ensures that the components are optimally matched to each other and therefore work efficiently. This co-operation means improved efficiency for Remeha as well: Since everything comes from single sources, the administrative effort is reduced.

During its two-year work, the Landshut development team was able to draw from its long-time experience in blower and control technology – as well as burner controls. These are responsible for controlling the centrifugal blower used – an NRG 118 – and by actively controlling the gas valve, it makes sure the gas being supplied is burned in a controlled fashion. The burner controller uses a communication interface developed jointly by ebm-papst and the Dutch subsidiary Argus Vision to transmit the speed to the blower directly and digitally. This enables the blower to assume the accurate speed control itself and thereby react even faster to changes in the ambient parameters. Maintenance and repairs are also simplified, since the blower's operating data, such as speed, motor current, operating time or am-

Hans-Joachim Klink, Design Manager at ebm-papst Landshut, and Gerhard Selmer (from left) during the weekly videoconference with the Remeha team

Condensing boiler technology

With the condensing heating concept, the efficiency is significantly higher than with conventional heating systems, because it additionally uses the heat of the exhaust gases generated. Condensing boilers operate with large heat exchangers, through which the water vapour condenses inside the device. The condensation heat is fed back to the heating circuit; as a result, it increases the "standard efficiency" to 109 percent and thus reduces the heating costs by up to 30 percent. An essential aspect is the lower environmental impact: The proportion of carbon monoxide (CO) is about a fifth lower and the proportion of nitrogen oxides (NO_x) about a third lower with condensing boilers than with older heating units.

bient temperature, can now be transmitted via the interface. On the one hand, these parameters allow potential problems to be discovered in advance and corresponding warnings to be issued in the control display. On the other hand, this information significantly eases troubleshooting when a repair is needed, which also results in reduced downtime.

To be able to offer such system solutions, at the beginning of the year ebm-papst had expanded its product range by adding a gas valve, which has now benefited the Tzerra's development. This gas manifold with the patented coaxial safety valve is integrated into the gas-air unit in a space-saving manner.

"The objective was to save space, while simultaneously developing a simplified plug-and-play method for assembly and maintenance." Gerhard Selmer

The requirements placed on the aluminium die-cast part of the housing with mixing adapter were also stringent. Here, particularly the narrow flatness tolerance that is mandatory for gas-tightness is something that can be reliably achieved at the specified dimensions only with a lot of specialised experience.

For the first time, the controls for blower and burner controller are combined in a single printed circuit board for the Tzerra. As a long-time partner, Argus Vision contributed its expertise in automatic gas stokers for this centrepiece. But that isn't all. Landshut specially built a new production line for series production of the entire unit. Each individual unit is inspected at the end to make sure it functions. Landshut developed special testing technology and built automatic testing devices for this, as Remeha expects a maintenance-free minimum service life of 15 years.

To fulfil this requirement, ebm-papst already conducted test runs and measurements using all specifications during the development phase. These included, for example, service life tests in climate chambers, tests with various gas types and operating modes as well as tests for vibration and shock resistance and noise level.

Remeha expects the Tzerra condensing boiler – cost-effective to purchase and operate – to attract wide interest in private households as an environmentally friendly alternative to conventional thermal power devices. Comfortable heat with a low impact on the wallet and environment – winter can come! ○

A great deal with quantity

Air-conditioner manufacturer Menerga is revolutionising large ventilation systems for data centres with GreenTech EC technology: combined fans increase output and operating reliability

Online transactions, mp3 downloads and video chats – day in and day out, hundreds of thousands of terabytes of data cause the wires of data centres worldwide to glow. To keep that from being more than a figure of speech, powerful air-conditioning units provide a remedy. That often happens at the expense of energy efficiency: A study of the German Energy Agency (dena) shows that cooling equipment alone constitutes 25 percent of a data centre's total power consumption. That is a condition that one of Menerga's innovations now plans to change. In addition to the common mechanical cooling, the "Adcoolair" air-conditioning unit also uses free cooling and "adiabatic" evaporation cooling, and saves a considerable amount of energy doing so. Even with regard to air conduction, maximum efficiency is the objective: so far up to eight GreenTech EC fans can operate in parallel in the air intake and exhaust of the device cube, thereby achieving combined output. Since air-conditioning units do not run all year round with the same output, the continuous controllability of GreenTech EC fans is a decisive advantage. Unlike other solutions, they feature high efficiency even at low output levels. The energy balance speaks for this solution: The cube already outperforms EU requirement 640/2009 for central air conditioners, which will not fully come into force until 2017.

Strength in numbers When development began, however, there was a critical limitation to GreenTech EC technology: An individual fan works with a maximum air flow volume of 10,000 cubic metres per hour, while a data centre requires many times that. But if one fan is not enough, why not have more fans do the job? Menerga had corresponding tests carried out in ebm-papst's test chamber – with positive results: "With an optimum arrangement, the air flows add up without any loss in output," confirms Project Engineer Ralf Mühleck, who supervised the development for ebm-papst. The tests also dealt with the topic of operating reliability, which plays a large role precisely for data centres. In addition to the redundancy provided by combining several systems, each system has built-in redundancy for air flow. Even if one fan unit fails, most of the required air flow can be maintained by the remaining devices. Despite its many advantages, the fan unit is no larger than comparable solutions; in contrast, "The compact EC motors are directly integrated in the centrifugal impeller, meaning the total design turns out substantially shorter." Maintenance is also very user-friendly, as Mühleck describes, "Each fan has a service life of at least 40,000 hours. And if one ever does fail, it can be replaced without much effort." ○

PLEASE DO NOT DISTURB!

In hotel rooms, fan coil units keep the temperature comfortable. GreenTech EC centrifugal fans ensure that guests and hotel managers sleep well – because they're quiet and save energy

Twelve-hour flight. Finally get to the hotel. Check in and then take a little snooze. The room is pleasantly cool, in contrast to the warm night outside. But there's no chance of getting to sleep: The air-conditioning unit under the window is droning endlessly. Then a little less cooling will just have to do. The room gets warmer, but the noise remains. The receptionist apologetically shrugs his shoulders and offers you another room with modernised air-conditioning technology. Absolute silence rules there. And yet it is comfortably cool. No air-conditioning unit is in sight.

Good climate, low costs The air-conditioning technology is integrated into the ceiling in the entrance area. The cooled air flows into the room through a narrow grille. And it does so without any sound at all. Concealed behind the ventilation slots there is a convector, which is called a fan coil unit. It consists of a GreenTech EC centrifugal fan and a heat exchanger. The fan circulates the room air and causes it to flow over the heat exchanger. In summer it cools using cold water, and in winter it heats using warm water. This way the room temperature can be controlled as desired. If the systems are connected to air ducts, they bring in fresh air. Air-conditioning devices installed under the window also use fan coils to circulate and control the temperature of the room air. In hotels, the devices are switched on an average of 292 days a year, usually in partial-load operation. As important components, therefore, efficient fans are particularly in demand. Investment in new fan coil units with GreenTech EC centrifugal fans pays off: They get by with up to 70 percent less energy. "As a result, the extra investment for GreenTech EC technology is amortised in a short time," emphasises Uwe Sigloch, Ventilation and Air-conditioning Technology Market Manager at ebm-papst. Aside from this, the compact fans can be quickly and easily integrated into the existing air-conditioning technology as a pre-assembled plug-and-play solution.

Wonderfully quiet The centrifugal fans have outputs between 40 and 250 watts for integration into air-conditioning systems. They deliver air volumes of up to 2,200 cubic metres per hour. Depending on the room size, there are individual, twin or triplet fans available with various motor outputs. The objective is to generate the most uniform air flow possible. If only one fan with high output is used, the outflow is too limited to one location. For very large spaces, multiple individual or double centrifugal blowers are combined and then work in parallel. GreenTech EC centrifugal fans master their task reliably and quietly. The fan unit consisting of impeller, motor and control system, specially tuned to one another, significantly reduces the noise level. The lightweight but robust plastic housings not only protect the convectors, but also act as acoustic insulation. By means of infinitely variable control, the hotel guest can easily adjust the room temperature to his or her personal needs. Then there is nothing more to stand in the way of a restful sleep – so your meeting can start as planned the next morning.

Dipl.-Ing. (FH) Martin Csermak

Overall development manager at ebm-papst St. Georgen

Innovative motor laminations in the ECI module

How technical improvements lead to cost reductions

Attractive prices and individually customised design are the objectives of our Development department. The prerequisites for this are flexibility and ever more advanced standards in the inside of our drives. This is underscored by the new motor laminations for our ECI module. In this article, I want to talk about some of the technical and cost-cutting highlights.

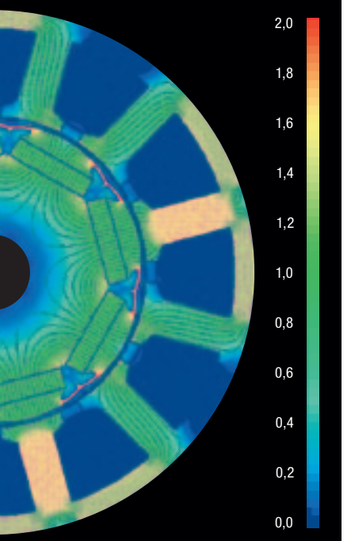
All common motor diameters, ECI 32, 42, 52, 63 and 80, are included in the new standard. In multiple iteration loops, we have optimised the magnetic circuit and the contour of the sheet steel so that a reduction of the detent torque by approximately 10 percent could be achieved. Simultaneously, this increased the power density by approximately 70 percent. With the ECI 6360, which has a motor size of 63 and an active motor length of 60 millimetres, a torque of 1 Newton-meter and an output of 420 watts is now attained. Basically, the length is flexible up to the maximum design; the preferred lengths are defined at 20, 40 and 60 millimetres. The end shields required for insulation can be used with the groove paper insulation for all lengths. The winding connections are defined with high precision, enabling a high degree of automation. To this is added the newly developed connection ring, which has a standardized configuration that permits all conceivable connections. In close collaboration between all members of the development team, we have designed the rotor and stator such that they can always be punched at the same time, thus avoiding waste of materials. For cost reasons, the magnets also have a cube-shaped design that is clever enough to allow the same magnets to be used for motor diameters ECI 32, 42 and 52; only their number differs according to the motor diameter. The connections and modules have been qualified in extensive tests and the series introduction has already taken place with the ECI 42 and ECI 63.

In summary, I can say that the technical improvements offer our customers solutions previously attainable only with larger drives and provide a cost benefit that applies even for smaller quantities, while also opening up new markets and applications. With the ECI module, we see great benefits for industrial drive engineering, intralogistics, medical technology or a wide variety of applications in this market. In addition, the benefits are evident in the automotive area for driving pumps, steering applications or adjustment requirements that impose stringent demands on the technical configuration while simultaneously meeting the price targets. O

ECI 63 with K5 electronics

Optimisation of the magnetic circuit

Aided by the finite element method (FEM), the motor can be magnetically optimised for the best output with the smallest possible material costs by means of ideal geometric design.



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Find us here: Trade fairs & dates

Trade fairs

eCarTec, Munich, 18 – 20 October 2011
Busworld, Kortrijk, 21 – 26 October 2011
Compamed, Düsseldorf, 16 – 18 November 2011
SPS/IPC/DRIVES, Nuremberg, 22 – 24 November 2011
AHR, Chicago, 23 – 25 January 2012
VSK, Utrecht, 6 – 10 February 2012
Interclima, Paris, 7 – 10 February 2012
Acrex, Bangalore, 23 – 25 February 2012
expoEnergy Wels, Wels, 29 February – 4 March 2012
Mir Klimata, Moscow, 12 – 15 March 2012
Nordbygg, Stockholm, 20 – 23 March 2012
Mostra Convegno, Mailand, 27 – 30 March 2012

Our complete trade fairs dates: www.ebmpapst.com

Events

10. ebm-papst Hallenmasters, Mulfingen, 6 – 7 January 2012
“Jugend forscht” (Youth research), Künzelsau, 1 – 3 March 2012

Technology for further reading

Are you interested in technical data, developments and products? The current issue of our sister publication tech.mag once again features a wide range of technical articles:

Diagonal fans make filter fans more efficient

Energy-efficient air-conditioning for a healthy room climate

New gas blower impresses with high power density

New ECI drive concept based on modular design

New EC motor design – Compact and efficient

More air performance and high energy efficiency

The **tech.mag 2/2011** is available from the end of October 2011. Contact our sales team or e-mail Corinna.Schittenhelm@de.ebmpapst.com

From trainees, for students

Four trainees help students with tips for applying

Taking the first step on a career path is no easy task; for many students, applying for a job is new territory. “In many cases, schools convey this knowledge in the form of a rough outline only,” says Nico Kiesel. He is part of the ebm-papst project “Trainees help students,” which is intended to close this knowledge gap. The four-person project team also includes his colleagues Anja Herterich, Myriam Wagner and Simone Amann. Since September 2010 the four trainees have volunteered their services, offering job application training sessions in secondary schools, business schools and college preparatory schools. Already 200 students in towns from Künzelsau to Schrozberg have gotten valuable application tips from this training.

The three training steps are geared towards helping “young people address their professional future independently and actively,” says Bernd Ludwig, Training Manager in Mulfingen, of the objective of the project – and he hopes that this support will bring in more applications. Part one of the training: to write a good application, to score highly on the applicant test and to be convincing in the job interview – with some practise, the teenagers are quickly able to do much better. The minimal age difference with the supporting trainees promotes easy dialogue: “We have tried to make this as casual as possible,” says Amann, trainee for Industrial Business Management with the additional qualification of International Business Management, reporting on the applicants’ training at the secondary school in Krautheim. At the start of the job application training, her colleague Herterich advises young people to leave behind a good first impression: “The application portfolio is your sales brochure – use it to sho w that you are the right person for the training position.” Therefore the project team gave the 36 students valuable tips for how they could commend themselves with their cover letter and CV. Once this hurdle is past, the applicant test is next. Using a test they composed themselves, the trainees quizzed students at the secondary school in Niederstetten about typical problems dealing with general education, ability to think spatially, German and mathematics. The last step: the job interview. “We talked about what we ourselves experienced,” relates Myriam Wagner. Of course there were also good tips: “Simply be yourself; don’t act” and “Present yourself positively.” The students were able to put this into practise right away by role-playing. They also practised keeping eye contact and the right strength in a handshake when greeting. Then just add the right clothing and the application will be a success. With that, the afternoon in Krautheim drew to a close, and all were excited.

Really quite practical The students also make intensive use of the second part of the project: During an afternoon at ebm-papst they get to know the company, experience vocational training programs of their choice in real-world applications and thereby gather their first work experience. Now that they are equipped with good tips for applying, that could soon become an exciting part of their everyday life. ○

On-site job application counselling: Trainees Myriam Wagner, Amann, Nico Kiesel and Anja Herterich (not on the picture) give students tips in the classroom

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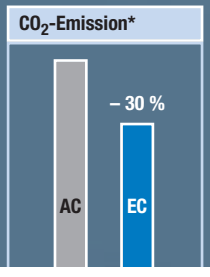
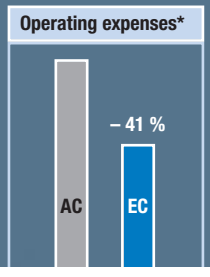
Compared to most of the other European countries the Czech and Slovakian Market is relatively small. To be successful our customers are oriented not only towards domestic business but mainly towards export. Our geographical location right in the middle of Europe makes a profit for domestic companies as well as for foreign companies that have placed new production plants and development centres: they are closer to their customers and more flexible. Based on these facts ebm-papst CZ s.r.o. was founded in 2003. The choice of location was easy: Following Praha, Brno is the second-largest city of the Czech Republic and it is right at the heart of the trading area. It’s 750 kilometres distance from the German to the Ukrainian border. So, seated in Brno we can support our customers on both ends very flexibly.

Thank you. You're welcome.



* Detailed calculations on our website
conventional technology
ebm-papst GreenTech EC technologie



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