Retrofit reduces costs and saves electricity

Saving energy at the ice rink

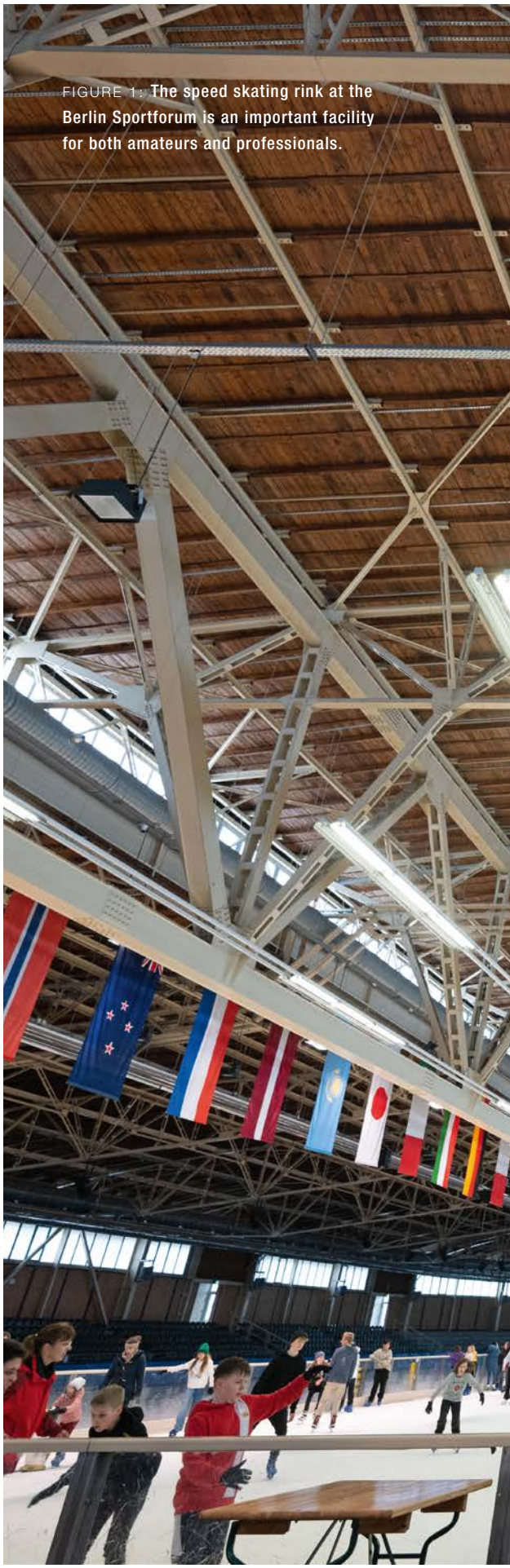
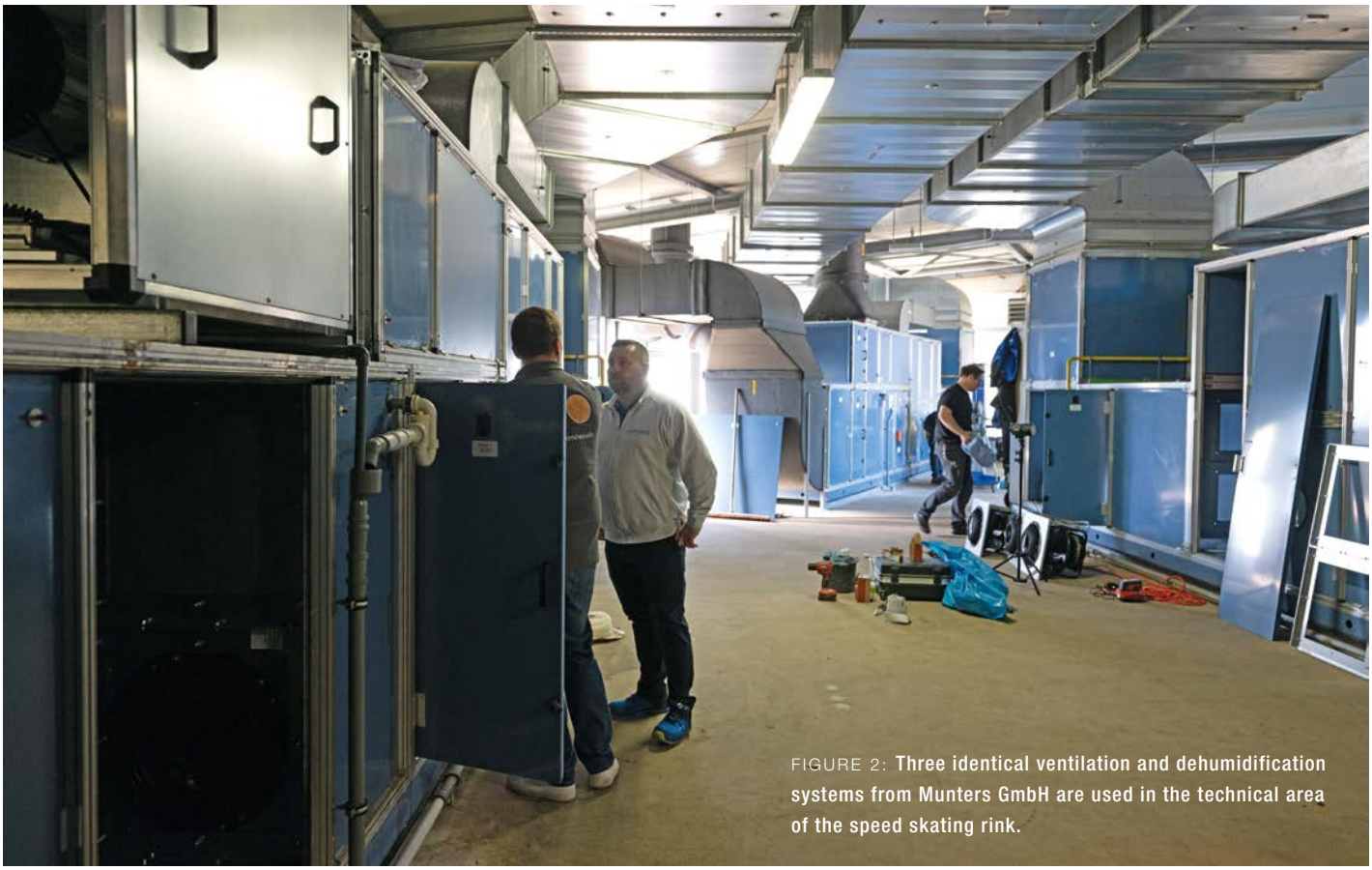


FIGURE 1: The speed skating rink at the Berlin Sportforum is an important facility for both amateurs and professionals.

The public sector faces major challenges. For example, cities and municipalities are required to achieve climate targets and save money. At the same time, the public wants to continue using public services such as sports facilities without restrictions. When it comes to air conditioning at these facilities, there is great potential for achieving a successful interplay of optimum use, energy savings, and reduced costs – all with a retrofit. The replacement of old belt-driven centrifugal fans at a speed skating rink in Berlin with a FanGrid with the latest generation of highly efficient EC fans is an impressive example of this.

ebm-papst



ebm-papst

FIGURE 2: **Three identical ventilation and dehumidification systems from Munters GmbH are used in the technical area of the speed skating rink.**

The Sportforum Hohenschönhausen in Berlin is a complex covering over 45 hectares with 35 facilities for different sports, including the speed skating rink. It was built in 1962 and expanded in 1986. It was the world's first 400-meter speed skating rink at the time. It is still an important training facility for both elite athletes and amateurs, as the speed skating rink is the local Olympic training center, venue for international competitions and home to numerous Berlin clubs (Fig. 1, p. 11). Athletes count on perfect conditions – including immaculately smooth ice. But this can only be achieved if the climate at the rink is also constantly cool and dry.

Avoiding temperature fluctuations

This is no easy task, as capacity utilization of the rink varies greatly: from a few Olympians training on the 262 and 440-meter lanes and public hustle and bustle on the 1,800 m^2 ice surface to competitions with 3,500 spectators in the stands. Temperature fluctuations at the rink also go hand in hand with changing capacity utilization. Condensation that col-

The old individual fans for each process air unit were each replaced with one FanGrid with three centrifugal fans from the latest RadiPac generation.

lects on the ceiling and the struts can form, drip onto the ice surface, and then ice up. However, these irregularities must be avoided. "To ensure that the difference between the ice and ambient temperature does not lead to condensation or mist formation, there must be a constant temperature of eight degrees Celsius in the rink," explains Sven Kuwatsch, technical manager of the Sportforum.

Circulating and dehumidifying air

The technical area of the speed skating rink contains three identical ventilation systems from Munters GmbH: one of them runs in continuous operation, while a second is connected if there is higher capacity utilization at the rink. A third system serves as redundancy if one of the other two fails (Fig. 2). It is not enough to simply circulate the air from the rink in order to achieve the desired temperature and thus prevent condensation, and this is why the systems also have a dehumidification unit. For this purpose, the air from the rink is drawn over a constantly rotating rotor, which the moisture settles onto. To enable the rotor to release the absorbed moisture, a small part of the rotor runs through a regeneration unit in which fresh air heated to around 130 degrees Celsius absorbs the moisture and carries it away to the outside. Because this also heats the process air, it is cooled down again before being blown back into the rink.

Belt-driven centrifugal fans: loud, inefficient, rusty

The systems were installed by Munters in 1998 and have been serviced regularly ever since. However, after 25 years of use under the tough conditions of an ice rink, the large belt-driven centrifugal fans for the supply and exhaust air in particular were looking worse for wear (Fig. 3). The metal parts were corroded and the old fans were also loud – and, even worse, highly inefficient. Not exactly a sustainable situation in an age when making energy and cost savings is an extremely important issue for the public sector. That's why Daniel Bürgel's suggestion to bring the systems into the present day with a retrofit came at the perfect time. The customer service consultant at Munters GmbH

ebm-papst

ebm-papst

FIGURE 3A + B: **The large belt-driven centrifugal fans for supply and exhaust air were inefficient, loud, and already corroded.**

ebm-papst

FIGURE 4: **The old fans were replaced with a FanGrid with three centrifugal fans from the latest RadiPac generation.**

In addition, the centrifugal fans are extremely quiet, intelligent, and incredibly user-friendly as a plug-and-play solution.

FIVE FREQUENTLY ASKED QUESTIONS ABOUT THE RETROFIT

1. When is a retrofit worthwhile?
   If a ventilation system is 10 or 15 years old, or older, a retrofit makes sense in many cases. Switching to new EC fans saves a significant amount of energy. Other advantages include durability, saving space, and operational reliability.

2. How do I approach a retrofit?
   Retrofit experts provide support in recording performance data, work out possible concepts, and can provide a rough overview of costs. They look at the purpose of the system and at which point it should be operated optimally.

3. How does a retrofit begin?
   The first step is a current measurement of the actual status. Then it is time to select the right fan. In this process, the entire system, environmental factors (altitude, temperature, humidity, etc.), options for electrical integration, and mains supply must be taken into account. During the subsequent installation, attention must be paid to the seals in the ventilation room. The new status is then measured at the end.

4. What payback period can I expect?
   With up to 60 to 70 percent energy savings, a rough payback period of two to three years can be expected.

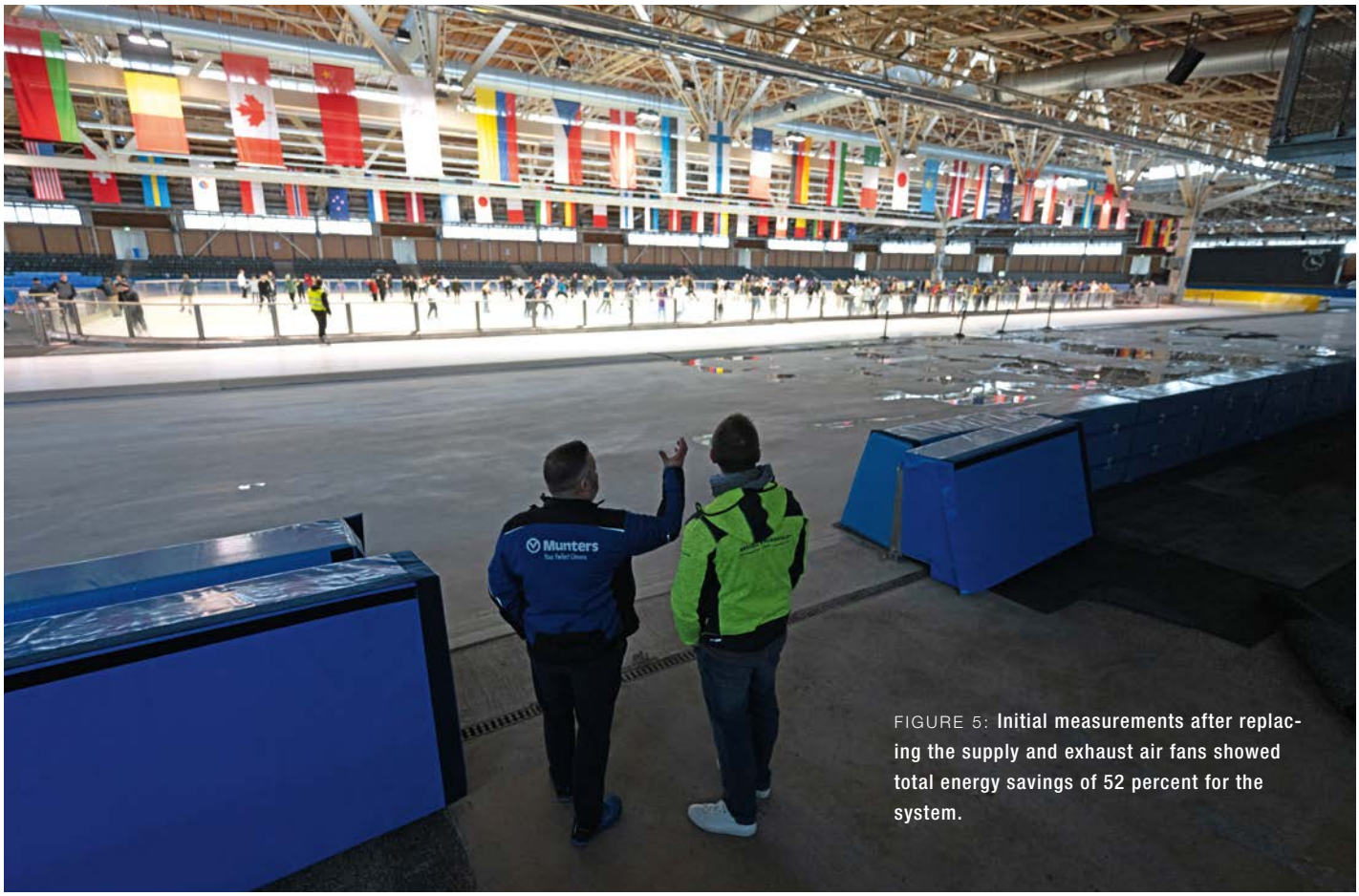
5. How are these savings achieved?
   Thanks to GreenTech EC technology, optimized aerodynamics, and demand-based speed control.

had just had a positive experience at a smaller ice rink in Berlin. He works closely with ventilation specialist Breuell und Hilgenfeldt GmbH, which, as an ebm-papst service center, uses highly efficient EC fans. "It works really well and we can achieve substantial energy savings," says Bürgel enthusiastically. "With savings of 30 percent calculated in advance, the Sportforum was also quick to make the decision."

The latest generation of RadiPac – more efficient, quieter, smarter

The old individual fans for each process air unit were each replaced with one FanGrid with three centrifugal fans from the latest RadiPac generation (Fig. 4, p. 13). They provide the solution to more demanding legal requirements and fulfill customers' desires to save more and more energy as well as money. In addition, the centrifugal fans are extremely quiet, intelligent, and incredibly user-friendly as a plug-and-play solution.

The aerodynamically optimized blade is made of high-strength, glass-fiber-reinforced composite material and is therefore resistant to harsh ambient conditions. The three-dimensional blade design enables high air flow rates and high pressures, so that even high-pressure applications can be covered. A static pressure increase of well over 2,000 Pa can be achieved. Combination with the powerful and compact EC motor with newly developed high-performance electronics means that the RadiPac's performance has been further increased compared to its predecessor. Thanks to their excellent control characteristics, they can be operated as required, which saves additional energy. They are also up to 7 dB(A) quieter than their predecessors.



ebm-papst

FIGURE 5: **Initial measurements after replacing the supply and exhaust air fans showed total energy savings of 52 percent for the system.**

Energy savings of over 50 percent

Initial measurements after replacing the supply and exhaust air fans showed total energy savings of 52 percent for the system. With an assumed operating time of 5,000 hours per year, the savings amount to around 120,000 kWh per year – at an electricity price of 35 cents, this equates to around 42,000 euros. At the time of measurement in the spring, the large outer track had already defrosted, and only the smaller and inner surfaces were still in operation. But major deviations are not expected when the rink returns to full operation in October (Fig. 5). Either way, this retrofit is an important step for the Sportforum on its path to a smaller environmental footprint: "We're looking everywhere right now to see where we can save energy. The retrofit in the speed skating rink is one of these measures – and an effective one at that," sums up Sven Kuwatsch. ○

AUTHORS ARE RALF BRAUN, HEAD OF SALES FOR GERMANY AT EBM-PAPST MULFINGEN AND ANDREAS GRUBERT, PROJECT MANAGER AT THE EBM-PAPST SERVICE CENTER BREUELL & HILGENFELDT GMBH.

YOU WOULD LIKE MORE INFORMATION ON THIS TOPIC?
PLEASE ADDRESS YOUR QUESTION TO:

Ralf.Braun@de.ebmpapst.com