

User Report

Energy efficiency for ventilation systems

From Underground Spring to Shopping Cart

Before precious drinking water from deep within the earth can conveniently land in the trunk of our car, a certain amount of effort is required. It's not just about extracting, testing and treating the water – bottling is also a very specialized process that demands a spotlessly clean environment. Extremely energy-efficient products from Yaskawa ensure the desired atmospheric environment. Your motor bundles pay for themselves in less than a year, as this example of a bottling plant shows.

On average, every German consumes more than 150 liters of mineral water per year. Around 200 companies nationwide ensure that our thirst is quenched, pouring the water into various bottles which are then available on the market.

One such company is located in Northern Hesse. In addition to various mineral waters, the company also produces and bottles carbonated soft drinks.

The filling process

Depending on the customer's product requirements, the plant adds carbon dioxide, flavors or concentrates. The finished products are then bottled – using only PET bottles in this case. These bottles are also produced in-house so that all added value remains under one roof. The bottles are produced in two stages. First of all, "preforms" are produced. These are small, fairly thick-walled blanks that can be transported easily without taking up too much space. Just before bottling, the preforms are transformed into the bottles we see in the supermarket.

In the blowing hall, the preforms are heated



The familiar PET bottles are generated from these preforms in the blowing hall.

using similar methods to glassblowers, molded to the desired shape and size, and then immediately transported to the adjacent filling hall using fully automated air-supported conveyor belts. Hygiene is top priority – the bottle must contain only the liquid product and no dust. In order to keep the ambient



The ventilation system is still controlled manually via a potentiometer. On the left is one of the filter bellows, through which the clean air flows into the hall.

air particularly clean, there is always a slight overpressure in the hall. Although air can flow out through open doors or ventilation flaps, it can never flow in unregulated.

For this reason, fans were placed on the roof of the gigantic hall, which measures approximately 25,000 cubic meters, in 2007 during the construction of the blowing hall. These fans use filters to control the air entering the hall and generate the overpressure. Since this setup functioned so well from the outset, little thought was given to the equipment over the years



The roof area demonstrates the impressive dimensions of the bottling plant. The surrounding area is mainly forests that provide the best water quality

Great savings potential

Nothing changed until certification was sought in accordance with DIN EN ISO 50001 as a result of the German Renewable Energy Sources Act (EEG). “Our EEG team took a close look at all the processes,” explains Michael Mutschmann, who, as the head of electrical engineering, immediately turned his attention to the ventilation systems. “Ten-year-old 18.5 kW belt-driven motors were installed here, which ran continuously without a break and were not frequency-controlled. That consumes a great deal of energy.”

Fortunately, he had known Harald Wylitek from Yaskawa for several years so his IE4 motor bundles were met with a positive response. “These were exactly the products

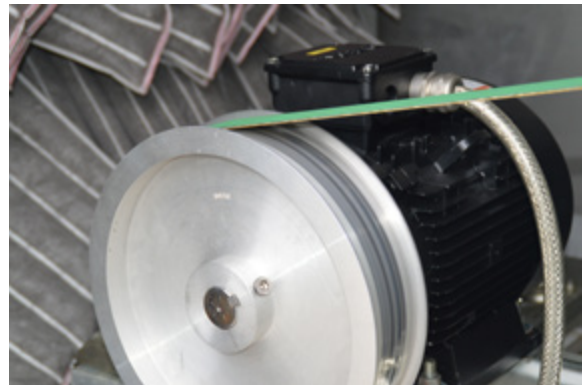


The new drive is much smaller and lighter than the old one. The compact frequency converter was mounted on the wall.

that we needed for a modernization,” says the electrical specialist. As a test, an old IE2 drive was initially replaced with the bundle, which included the drive and a suitable frequency converter. All of the other components of the ventilation system could be maintained, which meant that the investment volume and the installation effort were manageable.

Quick and easy modernization

“Of course we could not stop production for the upgrade and had only a very small window of time for the process – everything had to be right,” explains Michael Mutschmann when asked about the particular challenges. Therefore, the Yaskawa approach to configuration suited him very well: “At Yaskawa, the different applications are already saved with their default parameters. You simply choose which application you want to use and everything else is set automatically.



After five minutes, everything was complete,” marvels Mutschmann when describing the smooth transition.

Following these positive experiences, the other ventilation systems were also equipped with new Yaskawa motor bundles. They are currently controlled manually via a potentiometer. “We are still testing how the ventilation system functions in different seasons and works in conjunction with the exhaust air flaps,” explains the professional electrician, who does not rule out retrofitting an automatic control system here too.

The total power of all four new motors is now only 45 kW, whereas the old solution could consume 87 kW. The weight of the drives has also been halved. “Every kilogram counts, particularly when you are installing the system on the roof,” adds Mutschmann. For several months now, all four ventilation systems that provide overpressure in



Michael Mutschmann and Harald Wylitek have successfully worked together for several years, and colleagues from the other sites also rely on the knowledge of the expert from Yaskawa.

the blowing hall have been operating with the IE4 Yaskawa bundles instead of the old asynchronous drives. “With our current electricity rate, we expect an ROI of 9.7 months – this is so impressive that we plan to modernize additional plants, including plants at our other sites,” says Mutschmann.

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