COMPRESSOR SYSTEMS
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ALMiG
Compressor Systems

Pure as a good beer.

Eichbaum Brewery relies on an oil-free, water-injected screw compressor with heat recovery from ALMiG.

Founded 340 years ago, the Eichbaum private brewery is today the oldest industrial enterprise in the city of Mannheim, Germany. Modern technology ensures that the beverages are among the top products on the market. This recently included an oil-free, water-injected LENTO 45 screw compressor from ALMiG. This replaces an outdated oil-free rotary compressor. The brewery can thus ensure not only the Class 0 compressed air quality required in the food industry, but also energy-efficient process technology. Compared to the previous solution, Eichbaum saves up to 11,000€ a year.

"Beer isn't just beer. Anyone who knows a little about beer usually prefers a certain type of brew," describes Andreas Ihrig, deputy manager of the locksmith's shop at Eichbaum in Mannheim. He explains that the decisive factor is, among other things, which yeast is used. The brewery in the Palatinate region strictly adheres to the Purity Law of 1516. The brewers use pure yeast in addition to barley and hops. These are free of moulds, bacteria and other yeasts. In addition, there is brewing water from three of the company's own wells, about 130 metres deep. With an output of two million hectolitres, the Eichbaum private brewery is the largest and one of the most modern breweries in Baden-Württemberg. Eichbaum sees itself as a regional brewery with a premium product range, which, together with the Karamalz brand, is the national market leader in malt beverages and exports beer to more than 50 countries around the world.

Absolutely oil-free air

"But we are not only pure in terms of ingredients for our drinks, but also in terms of our compressed air," emphasizes Ihrig, pointing in production to a system that continuously fills bottles. "If compressed air comes into contact with food, it must be absolutely oil-free." This is the case not only for filling but also for aerating the wort or rinsing the fermentation tanks. But the energy source also supplies the pneumatic controls, drives the cylinders and controls the valves - here the quality does not have to be so high. Two separate compressed air networks are available to the brewery for the different requirements. One distributes the oil-lubricated factory air, the other the so-called sterile or oil-free air.

In the brewhouse, for example, the wort is ventilated with compressed air.

The heavy smell of malt no longer hangs in the air in the compressor room, but it is very loud. "These are our two oil-lubricated piston systems for the factory air," says Ihrig. "The machines have certainly been in use for 35 or 40 years. But he can't say that exactly. Next to it is a new compressor from ALMiG Kompressoren GmbH, which runs remarkably quietly. This plant has been producing sterile air here for almost a year, replacing an oil-free rotary compressor that was about the same age as the two piston compressors in the room. "One problem with the old system was the high energy costs," explains Walter Seibt, Head of Technology at Eichbaum: "Because it always supplied compressed air, even when none was needed - an absolute energy guzzler.

The oil-free, water-injected screw compressor from ALMiG not only ensures the Class 0 compressed air quality required in the beverage industry, but also an energy-efficient process technology.

The brewery attaches great importance to efficient process technology. It has therefore voluntarily committed itself to have the brewery certified according to the environmental management system in accordance with the internationally recognized DIN EN ISO 14001 standard. The energy management system according to ISO 50001 is integrated in this. This combined certification takes into account, among other things, the continuous reduction of environmental impacts, compliance with environmental legislation and the environmental declaration. "Particularly in the face of constantly rising energy costs, we are examining very specifically where we can make savings," says Seibt. One way of reducing energy costs is to generate compressed air efficiently - that's something on which those responsible agreed. When the old compressor finally broke down, they decided to invest in a new solution.

The right partner at your side

The contact to G. Wegener GmbH already existed for some time. The company from Haßloch near Mannheim offers maintenance and service as well as project management and sales of compressors. G. Wegener is also a sales partner of ALMiG from Köngen near Stuttgart in Swabia. "In an initial conversation, it quickly became clear that this was the right partner. In addition to the high level of competence, we get everything from a single source and don't have to work with different companies," says Walter Seibt, explaining the decision.

Roman Bareuther, technical salesman at G. Wegener: "We simulate and compare in order to achieve the optimal energetic result for the customer".

Roman Bareuther is a technical salesman at G. Wegener and looks after Eichbaum: "We have set up an energy balancing system in the brewery. This enables us to measure both compressed air consumption and power consumption." This software can be used to analyze the results and create various simulations. Compressors are specifically replaced for this purpose. "We simulate and compare in order to achieve the optimum energy result for the customer," describes Bareuther. The measurements take place both at off-peak times and at full capacity. After detailed analysis, the expert recommended the water-injected LENTO 45 screw compressor from ALMiG with a volume flow of 7.6 cubic metres per minute. The system can provide up to 600 cubic meters of compressed air per hour. Among other things, the brewery's managers were convinced by the

‚washed compressed air' principle used in these water-injected screw compressors. The compressed air is cleaner than the fresh air sucked in for compression because the foreign particles contained in it are effectively washed out by the circulation water.

Low speed, long service life

The LENTO system has significantly lower maintenance costs compared to alternative technologies such as dry-running screw compressors. This is mainly due to their simple design. In water-injected screw compressors, the compressor stages operate at four to five times lower speed than the dry-running variant. This has a positive effect on the service life of the bearings and thus on operational safety. Water also has a much better heat absorption capacity than oil. "With these compressors, we have very low final compression temperatures of well below 60 degrees Celsius. The compression process is close to isothermal compression, which ensures better efficiency and thus greater cost-effectiveness," explains Bareuther.

The speed control was also convincing. This enables the brewery to react to the changing demand for compressed air: "The compressor always produces the amount of compressed air that is currently needed - and thus only consumes the corresponding amount of electricity," says Seibt. "When idling, standard compressors without speed control require about 25 to 40 percent of the energy that is absorbed under full load - without producing compressed air. The load-idle control of a standard compressor in conjunction with a fluctuating compressed air requirement therefore causes expensive idle times. "The speed-controlled compressor from ALMiG runs at a constant operating pressure and does not switch between load and idle, but constantly adjusts the delivery quantity to the compressed air consumption," reports Bareuther.

At Eichbaum, compressed air is used in many different ways - for example, when filling bottles.

Constantly fresh water

A refrigeration dryer is also integrated in the LENTO system. This is an essential part of the water treatment and serves primarily as a ‚fresh water producer'. The condensate produced is collected at the condensate drain of the refrigeration dryer and returned to the internal cooling circuit as fresh water. "During commissioning, the compressor is filled with tap water and then continuously generates its own fresh water," says Seibt. On average, the complete quantity of water is exchanged once per shift in this way. The system therefore always works with fresh water. This also eliminates the need for a complex water treatment system.

This pioneering and simple system brings decisive advantages to the brewery. For example, the fresh water produced by the integrated refrigerant dryer is lime-free. "Viruses, bacteria or algae have no chance here. The water can also be discharged into the sewage system without treatment," says Bareuther.

Valve terminals in the brewery are also controlled with compressed air.

Saving energy all along the line

Compressors convert a large part of the energy used into heat - even if the LENTO compressor operates optimally at low temperatures. The ALMiG units are therefore equipped ex works with an integrated heat recovery system. The brewery now uses this heat to heat one or the other room in the house. "Compared to the old compressor, we now consume on average just under 21 percent less energy per year," says department head Seibt. In 2018, the brewery was able to save 68,526 kilowatt hours of electricity, which at 16 cents per kilowatt hour is almost 11,000 euros. "We have thus achieved our goal," he says with satisfaction.

A truck is currently being filled outside the building. "With the so-called spent grains," explains Ihrig. "These are residues of malt from beer production." This by-product is very popular with farmers, for example, as feed for raising cattle in the dairy industry. "It goes without saying that this spent grains must under no circumstances be contaminated with oily substances. We ensure this one hundred percent in our production and with the LENTO from ALMiG," says Ihrig.

Andreas Ihrig, Deputy Manager of the locksmith's shop at Eichbaum: "When compressed air comes into contact with food, it must be absolutely oil-free".

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