COMPRESSOR SYSTEMS
MADE IN GERMANY

ALMiG
Compressor Systems

Viruses? No chance!

B. Braun Avitum Saxonia GmbH relies on oil-free, water-injected screw compressors with heat recovery from ALMiG

Dialyzers are filter units for the blood washing of people with chronic kidney disease. B. Braun Avitum Saxonia GmbH is one of the world's largest manufacturers of these medical products. Compressed air plays a special role in assembly: hardly any machine runs without it. In order to ensure high availability of this medium despite the increasing demand for compressed air, the manufacturer has now supplemented the three existing water-injected screw compressors of the LENTO 46 series from ALMiG with a further unit of this series. Special features: energy-efficiently generated oil- and germ-free compressed air.

„The dialyser plays a central role in the dialysis therapy of patients with renal insufficiency. It functions as an „artificial kidney" and takes over important functions of the natural organ," explains Dirk Hagen. He is Head of Facility Management at B. Braun Avitum Saxonia GmbH at the Dresden site in the Radeberg plant, which is the largest employer in the town with around 600 employees. B. Braun Avitum Saxonia has been part of B. Braun Melsungen SE since 2004 and is one of the world market leaders in the production of dialysis filters. In addition to Radeberg, the plants in neighbouring Wilsdruff and Berggießhübel make up the Dresden site.

B. Braun Avitum Saxonia GmbH at the Dresden site in the Radeberg plant is the largest employer in the town.

„Patients with renal insufficiency have to go to dialysis three to four times a week for several hours. There, with the help of the dialyser, various physical processes remove both toxins from the metabolism and excess water from the blood," Hagen continues. For this purpose, the patient's blood is passed through up to 15,000 hollow fibres in the dialyzer, whose walls consist of a thin semi-permeable membrane. This has precisely fitting pore sizes through which toxins and excess water are removed and essential blood components are retained. The performance and blood compatibility of the dialyzers are crucial for the well-being of the patients. The more biocompatible the materials of the dialyzer are and the more clearly essential substances can be separated from toxic substances in the blood, the more effective the dialysis therapy. The manufacturer produces the high-tech fibres in Berggießhübel, while the dialysers are assembled in neighbouring Radeberg.

Absolutely oil-free air

Not much works in Radeberg without compressed air: the energy carrier supplies the pneumatic controls, drives cylinders and controls valves - applications where high compressed air quality is required because production takes place in clean rooms. „We also use compressed air for wet leak testing of the dialysers after assembly. And because the dialysers get wet during the process, we have to dry them with compressed air afterwards," Hagen describes two typical examples. „In these cases, the compressed air must be free of oil and germs as well as extremely low in particles." Various compressed air networks are available to the plant for the different qualities.

„Simply put, a dialyzer is an artificial blood filter that takes over the function of a kidney",

„Until 2017, we used oil-injected compressors to generate compressed air. Nevertheless, there was always a risk of contamination."

„Until 2017, we used oil-injected compressors for compressed air generation," Hagen tells us. „In order to keep the compressed air oil-free, each plant had its own treatment chain consisting of a cyclone separator, pre-filter, dryer, after-filter and activated carbon filter. Nevertheless, there was always a risk of contamination." The manufacturer wanted to rule this out completely. When the topic of energy efficiency became more and more important in the company, those responsible looked at various concepts from different suppliers. ALMiG Kompressoren GmbH from the Swabian town of Köngen near Stuttgart was finally able to convince them.

The right partner at your side

Uwe Herrmann is the managing director of KFA Druckluft-technik from Zwenkau, south of Leipzig. With his company he offers maintenance and service as well as project management and sales of compressors. He is also a sales partner of ALMiG. „In an initial discussion, it quickly became clear that we could supply both the compressed air supply and all the necessary components from a single source, so the customer would not have to work with different suppliers," explains Herrmann, leading the way to the compressor room with Dirk Hagen.

„We have set up an energy balancing system. With it, we can measure both the compressed air consumption and the power consumption," Herrmann describes. The software analyses the results and creates various simulations. For this purpose, compressors are specifically exchanged until the expert achieves the optimum result for the customer in terms of energy. The measurements took place both during off-peak periods and under full load. After a detailed analysis, the expert recommended the LENTO 46 water-injected screw com-

pressors from ALMiG with a volume flow of 8.6 cubic metres per minute. The system can provide up to 600 cubic metres of compressed air per hour. To cover the compressed air demand, three machines of this series had been used until then.

B. Braun Avitum Saxonia relies on oil-free, water-injected screw compressors from ALMiG for its production.

Enough space for expansion

The previous systems were distributed all over the factory. The new compressed air station was to be installed in a central location. For this purpose, B. Braun Avitum Saxonia separated an area in the hall for a room large enough to expand the compressed air station if necessary. It took just three months from the ground-breaking ceremony to the switch-on. The compressors run remarkably quietly.

Since summer 2020, there has also been a fourth machine in the room, a LENTO 55 with a volume flow of 8.19 cubic metres per minute, which can provide up to 600 cubic metres of compressed air per hour. „We have grown in recent years, and with that the demand for compressed air continued to increase," Hagen reports. „We work here around the clock, seven days a week. To ensure that under no circumstances can there be a failure of the compressed air, we decided to invest in another machine as redundancy."

Low speed, long service life

The LENTO units have significantly lower maintenance costs compared to alternative technologies, such as dry-running screw compressors. „This is mainly due to their simple design," describes ALMiG expert Herrmann. „The compressor stages in water-injected screw compressors 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 reliability." Water also has a much better heat absorption capacity compared to oil. „We have very low compression end temperatures of well below 60 degrees Celsius with these compressors. The process is close to isothermal compression, which ensures better efficiency and thus greater economy," explains Herrmann.

The speed control was also convincing. This enables the plant to react to the changing demand for compressed air. The compressors always produce the amount that is needed at the moment - and thus only consume the corresponding amount of energy. When idling, standard compressors without speed control require about 25 to 40 per cent of the energy consumed under full load - without producing any compressed air. The load-idle control of a standard compressor in combination with a fluctuating compressed air demand therefore causes expensive idle times.

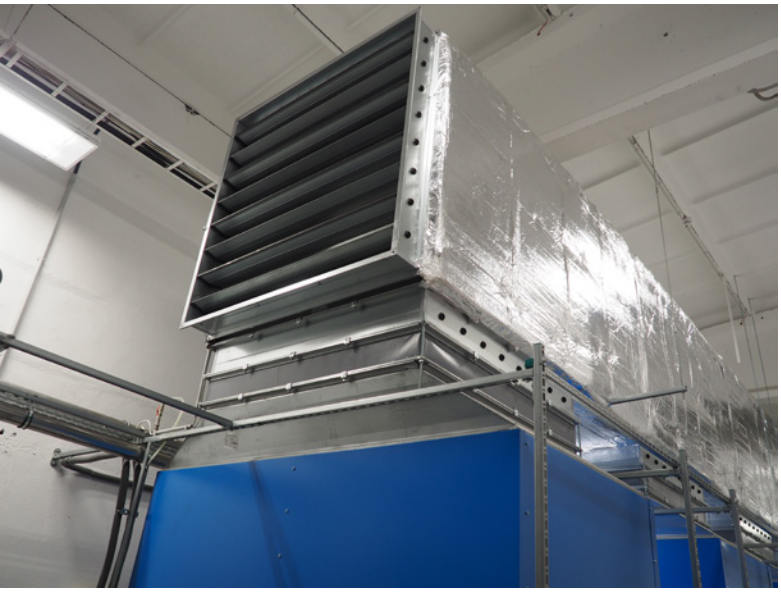
By using screw compressors of the same size, an even utilisation of the equipment is possible through constant base load changes. Since the machines are always in the optimal speed range, both the energy requirement and the noise emission are lower.

The ALMIG Air Control P controls the compressors in a network. This allows the energy advantages of speed control to be fully utilised.

„Out of the box, the controllers are equipped with a balance monitoring system and have a web server," explains Herrmann. „This allows us to read out all the relevant data online - for example, the running behaviour of the past operating days or weeks, how heavily the compressors are utilised and when the next maintenance is due." In addition, he records the amount of air consumed and the energy consumption. „If we notice that the operating behaviour changes significantly, we can react immediately," says Hagen. „With the old machines, we had a mains pressure of about eight bar due to the higher-level control system. We were able to reduce the energy relevance by 1.5 bar in the overall performance." With a drive power of the machines of 80 to 135 kilowatts, this is a reduction of seven per cent - an important step towards saving CO2.

The Federal Office of Economics and Export Control (BAFA) also thinks so. With the support of ALMiG expert Herrmann, the plant in Radeberg was able to apply for subsidies from the Federal Office. Another good reason for the company why the investment in the new equipment was worthwhile.

But even though the LENTO compressors work optimally at low temperatures, they convert a large part of the energy used into heat. To ensure that this does not simply go to waste, the units are equipped ex works with an integrated heat recovery system. „We use this heat to heat our warehouse in the cold months," says Hagen, pointing upwards to the ceiling. There, the warm air is blown into the hall via a pipe.



The company uses the heat from the compressors to heat its warehouse in winter.

Always fresh water

But those responsible at B. Braun Avitum Saxonia were particularly convinced by the principle of washed compressed air, as used in the water-injected LENTO screw compressors. „The compressed air is cleaner than the fresh air drawn in for compression because the foreign components it contains are effectively washed out by the circulating water," explains Herrmann. This has been confirmed by several independent renowned institutes - including Fresenius. For this purpose, the LENTO system includes a refrigeration dryer, which is an essential part of the water treatment. „The compressor is filled with normal tap water during commissioning," describes the compressed air expert. „The condensate produced is collected at the condensate drain of the refrigeration dryer and fed back into the internal cooling circuit as fresh water." On average, the entire water volume is exchanged in this way once per shift.

The system thus always works with fresh water. There is no need for an elaborately installed water treatment system. „The fresh water produced in this way is free of limescale. Viruses, bacteria or algae don't stand a chance. It can be discharged into the sewage system without treatment," says Herrmann.

„Recently I was asked what happens when the compressor sucks in corona viruses." The ALMiG expert pulls his mask tight: „The temperature of the compressor alone would destroy all the viruses already in the compression process."

With the four compressors from ALMiG, B. Braun Avitum Saxonia always has enough compressed air on hand, even during high-load phases, and is also equipped for further growth. „It gives us exactly the quality of compressed air we need. It is cleaner than the air we breathe," says Hagen.

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Uwe Herrmann (left) and Dirk Hagen at the new LENTO 55: „Cleaner than the air we breathe".