

## Unsurpassed in purity

Röchling Medical Solutions SE in Neuhaus, Germany relies on oil-free screw compressors with energy-saving heat recovery from ALMiG





**Röchling Medical Solution SE in Neuhaus develops and manufactures customized packaging solutions for any medical filling material. For the production of the hollow plastic bodies, Röchling relies, among other things, on extrusion blow molding. In this process, oil- and germ-free compressed air plays a decisive role in achieving the required quality. A compressed air station is used with currently seven water-injected screw compressors of the LENTO 110 series from ALMiG, which are said to be unique in terms of safety. An expansion of the station is planned.**

„We manufacture primary packaging materials for pharmaceutical products under state-of-the-art cleanroom conditions in class GMP C and D,” describes Jürgen Neubauer. He is Manager Technical Building Equipment at Röchling Medical in Neuhaus am Rennweg, a small town in the Thuringian Forest. „We inaugurated the cleanroom building in 2017. We needed to expand our manufacturing capacity here at the site to be prepared for future growth,” he says. In 2016, the Röchling Group added the Medical division to its previously two divisions, Industrial and Automotive. Various major projects quickly arose. The company reacted.



Röchling Medical in Neuhaus am Rennweg: The clean room building was inaugurated in 2017. The company needed to expand its manufacturing capacity to be prepared for future growth. (Photo credit: Röchling Medical Solutions SE)

Röchling Medical exports around half of its goods abroad. These include closures, measuring cups, dropper inserts, and pourers with different dosing options, as well as various containers: „We can manufacture vials with a capacity of two milliliters and all dimensions up to canisters of ten liters or even larger,” Neubauer tells us, pointing to the machines that manufacture products in the GMP „C” cleanroom class. To produce the hollow bodies, we rely on multilayer extrusion blow molding, among other processes.” In this process, plastic is melted and forced through a die. A tubular preform is created, which is transferred to the ready blow mold. Increased pressure causes this to conform to the inner contours of the mold. The forming process is additionally carried out by blowing air in the mold. „We can also produce hollow bodies with a multilayer wall structure in this way,” says Neubauer. Crucial for the quality of the products: No germs may enter the material with the blowing air. For this reason, particularly high demands are placed on the purity of the compressed air.



Röchling Medical manufactures various containers with capacities ranging from two milliliters to ten liters. (Photo credit: Röchling Medical Solutions SE)

cyclone separator, pre-filter, dryer, after-filter and activated carbon filter. „Nevertheless, there is always a risk of contamination with oil-injected machines. If oil were to get into the pipeline network, it could cause us serious economic damage,” Neubauer knows. „Our goal was to achieve compressed air class 1 while enabling safer operation and being more energy efficient.”

Those responsible looked at various concepts from diverse suppliers. In the end, ALMiG Kompressoren GmbH from the Swabian town of Köngen near Stuttgart was able to convince them with its water-injected machines from the LENTO series. „We were impressed by the coherent machine concept,” recalls the Röchling expert.

**A reliable partner**

Uwe Herrmann is the managing director of KFA Drucklufttechnik 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. „We have set up an energy balancing system. This allows us to measure compressed air consumption and power consumption.” The software analyzes the results and creates various simulations. For this purpose, compressors are specifically replaced until the expert achieves the optimum result for the customer in terms of energy. The measurements took place during off-load periods and also under full load. After a detailed analysis, the expert recommended the LENTO 110 water-injected screw compressors from ALMiG with a volume flow of 16 cubic meters per minute at ten bar overpressure.



Guaranteed not off the shelf: ALMiG’s compressed air station meets very special requirements for clean compressed air.

When the building for the new compressed air station was in place, the first four units were installed. A few months later, two more

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### **Oil- and germ-free compressed air**

Until the new building in 2017, Röchling Medical relied on oil-injected compressors. To remove oil from the compressed air, each unit was equipped with its own treatment chain consisting of a

compressors of the same series followed. In 2021, those responsible at Röchling decided to invest in another machine from the LENTO series due to the increasing order situation. Production runs 24 hours a day, seven days a week. With the installation of the new compressors, the old units were gradually taken off line.

### 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 °C with these compressors. The process is close to isothermal compression, which ensures better efficiency and thus greater cost-effectiveness,“ explains Herrmann.

The speed control system was particularly convincing. This allows the plant to respond to the changing demand for compressed air. The compressors always produce what 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 percent of the energy consumed under full load - without producing any compressed air. The load-idle control of a standard compressor in conjunction with a fluctuating compressed air demand therefore causes expensive idle times. By using screw compressors of the same size, it is possible to achieve a uniform utilization of the equipment by constantly changing the base load. The utilization rate is between 60 and 70 percent. The machines rotate - always five at a time. Since the machines are in the optimum speed range, both energy requirements and noise emissions are lower.

The ALMiG Air Control HE control system with integrated web server is used, via which all relevant data can be read out online - for example, the running behavior of the past operating days or weeks, how heavily the compressors are utilized, and when the next maintenance is due. In addition, the control system records the volume of air consumed and the energy consumption. „If we notice that there is a significant change in operating behavior, there is an alarm and we can react immediately,“ Neubauer describes.



The ALMiG Air Control HE control system regulates the compressors in a network depending on consumption. This allows the energy benefits of speed control to be fully exploited.

But even though LENTO compressors operate 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 cleanrooms in winter and dehumidify them in sum-

mer. That's almost 2,000 square meters,“ says Röchling expert Neubauer enthusiastically. „This eliminates the need for district heating, heating oil, and gas - all while consuming an enormous amount of energy.“



Processes such as blow molding are used.

### Always fresh water

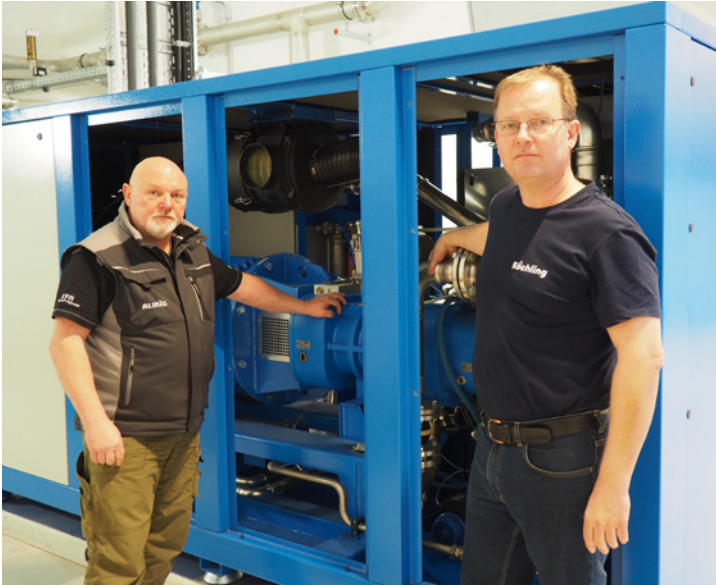
Those responsible at Röchling Medical were particularly impressed by the principle of washed compressed air, as used in the water-injected LENTO screw compressors. „The compressed air is cleaner than the fresh air drawn in for compression because the foreign components it contains are effectively washed out by the circulating water,“ explains Herrmann. This has been confirmed by several independent renowned institutes - including Fresenius. For this purpose, a refrigeration dryer is integrated in the LENTO system, which is an essential component of the water treatment system. „The compressor is filled with normal tap water during commissioning,“ describes the compressed air expert. „The condensate produced is collected at the refrigeration dryer's condensate drain and returned to the internal cooling circuit as fresh water.“ On average, the entire volume of water is exchanged in this way once per shift. The plant thus always operates with fresh water. There is no need for an elaborately installed water treatment system. „The fresh water produced in this way is lime-free - and free of viruses, bacteria or algae. It can be discharged into the sewer system without treatment,“ says Herrmann. „We are in the Thuringian Forest here. The seeds of the pine trees produce very small particles that settle as a yellow mist. If a compressor sucks in these organic substances, spontaneous combustion can occur. With LENTO machines, these particles are completely washed out.“

„For example, the compressors automatically shut down when the measurement technology registers changed environmental conditions such as residual oil aerosols.“

### Not off the shelf

Herrmann and his team at Röchling installed anything but a standard system. In terms of safety, this is unique in the world, he says. „For example, the compressors switch off automatically if the measurement technology registers changed environmental conditions, such

as residual oil aerosols. These can be caused, for example, by trucks that stop near the compressed air station with the engine running. „If a compressor sucks in this air, it can jeopardize safe production,“ Neubauer says. In this case, the compressed air is not fed into the network but into an expansion chamber - until the values are stable again. In addition, KFA Drucklufttechnik provides only 1.2 liters of oil for bearing lubrication per maintenance cycle for each machine. With the old, oil-injected systems, this was still 80 liters each. This also ensures significantly higher operational reliability, as required by ISO and the FDA.



Uwe Herrmann (left) and Jürgen Neubauer at a LENTO 110 screw compressor: „Cleaner than the air we breathe.“

Jürgen Neubauer looks at the measurement technology. „We have a pressure dew point of -50 to -60 degrees with the machines and the associated preparation. This also has a positive effect on air purity. If you imagine that there are about three million particles in a cubic meter of compressed air and that we can reduce this number to as low as 200, depending on the size, that's very impressive.“

On this day, Uwe Herrmann and his team are on site for maintenance work at Röchling in Neuhaus. „Our visit to the LENTO machines is only required every 4,000 operating hours,“ he says. That corresponds to about two inspections a year, he adds. Jürgen Neubauer is satisfied with the plant and that with ALMiG and KFA Drucklufttechnik he gets everything from a single source - including reliable service. „The project was certainly not standard,“ he says. After all, when the new machines were in place, we couldn't just shut down the old compressors. In order not to interrupt production, this had to be done step by step. This is only possible with an experienced partner,“ he says. Today, everything is running to our complete satisfaction.

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