COMPRESSOR SYSTEMS
MADE IN GERMANY

ALMiG
Compressor Systems

Enoplastic relies on highly efficient screw compressors from ALMiG for the production of high-quality bottle caps.

Italian Excellency: Classified

The Italian company Enoplastic manufactures closures and labels for wine bottles, among other things. Compressed air is used in all production stages - and so far accounts for about 30 percent of electricity consumption. With the aim of reducing this, the manufacturer is investing in three new screw compressors of the V-Drive T series from ALMiG. With their energy-saving speed control, the machines adapt to permanent load changes and avoid expensive idling times. The integrated heat recovery system also heats the entire workshop. The estimated savings in electricity and heating costs are up to 75,000 euros a year.

Piero Macchi loved good wine and industrial machinery - he brought these two passions together and in 1957 founded a company for the production of caps and closures for wine, oil, vinegar and similar products. Today, Enoplastic S.p.a., based in Varese in the north-west of Lombardy, Italy, is one of the world's largest manufacturers of PVC and polylaminate capsules, screw caps, synthetic corks and seals for still and sparkling wines, spirits, olive oils and vinegars. In addition to Varese, the approximately 400 employees also work at locations in Spain, France, the USA, Australia and New Zealand. The group produces around 2.5 billion closures and labels a year and exports them to more than 60 countries.

Enoplastic, based in Varese, Italy, is one of the world's largest manufacturers of bottle caps. In production, the manufacturer relies on screw compressors from ALMiG.

"Our products stand for Italian excellence and a high level of creativity", describes the production manager of Enoplastic in Varese. "We offer creative and future-oriented solutions, the necessary technical know-how and a precisely fitting production with a highly modern machine park." Because the demands of the customers continue to increase and the market is becoming more and more global. The production facilities include printing and gravure printing machines for up to eight colours, which give the products their unique character. In addition, specially developed forming machines are used to process the semi-finished products. The basis of the high-quality products are coils of aluminium and PVC, which are joined together in a special machine to form a multi-layer composite.

Nothing works without compressed air

"Behind every cork and every screw cap there is a lot of compressed air", says the Enoplastic production manager, pointing to one of the forming machines that draws a lot of energy from this form of energy. Compressed air is an indispensable resource for Enoplastic and ensuring the efficiency of the production plant is a maintenance priority. The production of compressed air has reached about 30 percent of electricity consumption and the company wanted to take measures to improve the situation.


Embedded cylinders for retro-engraving printing.

The renovation of the main production hall was the perfect time for this. The compressors that had been in use up to that point had now clocked up almost 75,000 working hours. "With new compressors, we wanted above all to noticeably increase energy efficiency and reduce total power consumption by about 15 percent," says the production manager, explaining the goals. "We also wanted to significantly reduce CO_2 emissions." Those responsible looked around the market. Enoplastic had been using a DIRECT 45 series screw compressor from ALMiG in another factory building for about seven years - and had had very good experience with this machine.

An external energy consulting firm had installed an analysis system in the production area. This made it possible to measure both compressed air consumption and power consumption. With this software the results can be analyzed and different simulations can be created. Compressors are specifically exchanged for this purpose. "We simulate and compare in order to achieve the optimum result for the customer in terms of energy", describes Roberto Spezzibottiani of ALMiG Italia. The measurements take place both in times of low capacity utilization and under full load. After detailed analysis, the expert recommended three air-cooled and speed-controlled screw compressors of the V-Drive T series with heat recovery. The volume flow is 65 m^3/min - measured from 6am to 10pm - and 32 m^3/min at night. The compressor can provide up to 81 cubic metres of compressed air per hour. Among other things, the compressors convinced the responsible persons with their combined efficient two-stage compression with speed control.

"We simulate and compare in order to energetically achieve the optimal result for the customer"

Compressors of the latest generation

The gear drive enables the two compressor stages to achieve the optimum transmission ratio. An oil mist for intermediate cooling ensures efficient compression. At the same time, the oil prevents

Three new highly efficient V-Drive T series screw compressors from ALMiG are now in operation.

the pressure dew point from falling below. "This eliminates condensate failure in the second compressor stage," says Roberto Spezzibottiani.

"The lower speeds and a lower internal pressure difference increase the efficiency of the compressors".

The V-Drive T compressors automatically and sensitively adjust the delivery quantities to the fluctuating air consumption - this is ensured by the speed control and the varying motor speed. This reduces costly and energy-intensive idle time. "The lower speed and a lower internal pressure difference between the stages increase the efficiency of the compressors," explains Spezzibottiani. "They last longer and make the compressor unit more reliable." With several thousand load cycles per year, the energy expenditure can add up considerably. In comparison with compressors that are controlled in load-idle mode, ALMiG units also save considerable amounts of energy as a result.

The average delivery rate of the compressors is 65 m^3/min during the day and an average of around 32 m^3/min at night. The line pressure is 6.8 bar and is continuously adjustable. To ensure high availability, all three compressors are always on standby. In the base load change the compressors start up one after the other. One then serves as a safeguard in case a compressor needs to be serviced or repaired. In addition, Enoplastic can react reliably to peak times and is equipped for further growth in the coming years.

Reliably controlled

The ALMiG Air Control HE controls the compressors that are currently in use in a consumption-dependent network. This enables the operator to fully exploit the energy advantages of speed control, because the compressors only generate as much compressed air as they actually consume. The pressure remains constant. "If the consumption increases towards the maximum delivery quantity of a system, the second compressor switches on. A speed reserve is maintained, so that no pressure fluctuations occur due to switching the compressors on and off and the station runs in the economic range," explains Roberto Spezzibottiani. In the main load phase, i.e. during the main production period, two compressors run synchronously at the same speed. In the low load phase, when less is produced, only one compressor runs. This automatically adapts to the consumption profile. Since the machines are located in the medium speed range, both energy consumption and noise emissions are lower.

In addition, the machine components are subjected to less stress, which has a positive effect on the service life of the compressors. "Our premium controllers are equipped with an accounting monitoring system by default, plus a web server," Spezzibottiani continues. This makes it possible to read out all relevant data via the Internet.

The ALMiG Air Control HE controls the compressors in a consumption-dependent network. This allows the energy advantages of speed control to be fully exploited.

Service technicians can read off the running behaviour of the last

days or weeks of operation via remote maintenance and can see how heavily the compressor is used, when maintenance is due and whether there are still reserves available. “If we notice that the operating behaviour has changed considerably, the responsible employees can react immediately“, says Spezzibottiani.

It is important that the compressed air is dry. It is conditioned with a refrigerant dryer, pre- and after-filter. All units are also equipped with automatic condensate drains, which are connected to an oil separation system via activated carbon filters. “One advantage is that the external refrigerant dryers are thermally separated from the hot zone of the compressor,“ says Roberto Spezzibottiani. “This means there is no so-called refrigerator in the oven.“

Save heating costs with heat recovery

One of the objectives was to integrate the heat recovered by the compressors into the heating system and to heat the new building completely during the winter months. For this purpose, the machines are equipped at the factory with heat exchangers and water control valves for heating water to 70 °C. The oil that cools the compressors heats the water in a heat exchanger and is thus fed directly into the heating system. This results in a high savings potential in heating costs, especially in winter - estimated at 17,000 € per year.

After eight months in operation, which corresponds to around 3,000 working hours, the compressors run extremely reliably. There were no failures during the entire period. The expected total savings are around 75,000 € per year.

„The return on investment of the entire compressed air station will probably be achieved in 3.5 years,“ calculated Enoplastic. At present, the efficiency of the system is around 0.095 kilowatt hours per cubic metre.

The V-Drive T screw compressors are also maintenance-friendly in design and only require servicing every 4,000 hours of operation: all components are easily accessible from one side, and the large sound-insulating doors can be easily removed. This significantly reduces maintenance and downtimes. This also keeps service costs manageable.

The Enoplastic management is convinced that the decision to continue working with ALMiG was the right one.

Those responsible at Enoplastic were enthusiastic about the excellent advice provided in advance and the competence of ALMiG staff. The installation was implemented in detail as ALMiG had planned. „The project took about a year from making contact to commissioning the last machine,“ describes the production manager.

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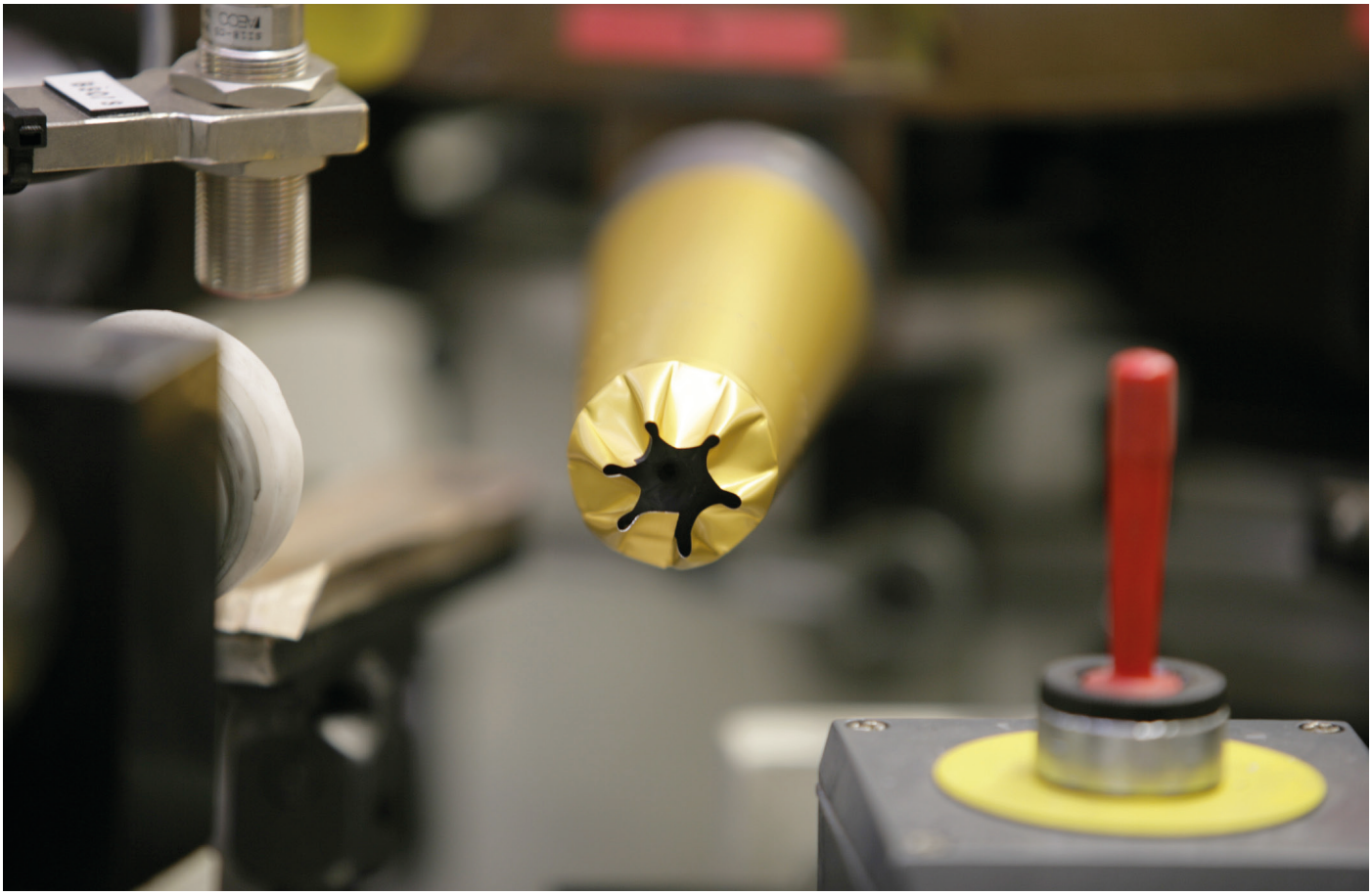

At Enoplastic, compressed air is behind (almost) every production step.