Set It and Forget It

Pneumatics Ensures Reliability in Packaging Application

Xavier van Aelst, director food and beverage, Aventics

Machines for filling milk or juice must work around the clock. With an output of up to 12,000 cartons an hour, disruptions and downtime are not at all welcome. For this reason, availability plays a major role in selecting machine components. Elopak's motto here is "set it then forget it." Their E-PS120A is the first fully aseptic filling machine for gable top packaging. This efficient, powerful solution presented by the packaging specialist ensures high reliability owing in part to robust, food-compliant pneumatics from Aventics.

"The latest technical features are not our main concern when selecting components," said Wolfgang Buchkremer, senior manager research and engineering at Elopak EQS GmbH in Mönchengladbach (Norway.) "We need components that play their part without standing out - we want to be able to install and then forget them. And that isn't possible with just any component."

In developing its fully aseptic gable top system, Elopak is pursuing its strategy of ultra-functional packaging concepts. The Pure-Pak Advanced filling concept meets both increasing expectations of consumers regarding product design, functionality and quality, and industry requirements regarding maximum efficiency and machine availability.

The E-PS120A aseptic filling machine offers top-class automation technology and is divided into six modules. The inserted packaging material is recorded, set upright, and pre-folded. The sealing cap is then applied via ultrasound welding and the bottom is heated and pressed to seal the carton. In a separate chamber, the packaging is sterilized with hydrogen peroxide, and the product is then filled with a single shot. Finally, the packaging is induction-welded and transported out of the machine.

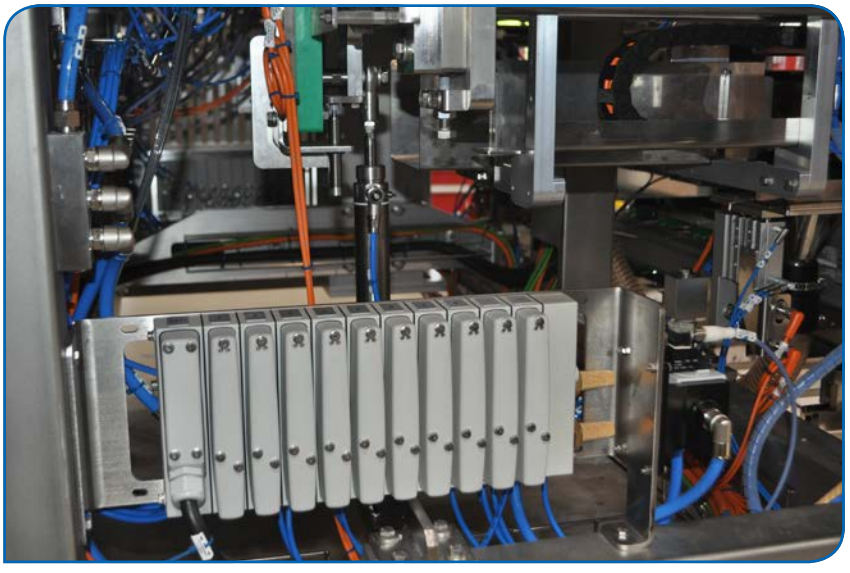
With this system, users can choose from three packaging sizes of 500 ml, 750 ml, and 1 L. Since all machine processes are geared to the packaging height, the only adjustment required to switch between them is the height of the bottom of the carton. Performed by a cylinder, this movement takes just a few minutes and provides a major advantage compared to competitor machines.

The design and construction of such a modern filling machine are complex tasks. A sterile environment and aseptic packaging are vital to maintain product quality for the long term at room temperature without cooling the products or using other methods. This means the ultra-sensitive drinks, dairy products, and liquid foods have to be filled hygienically and securely while the machine components are subjected to extreme environmental conditions such as cold, humidity and splashes.

Elopak owes its success to technical expertise and decades of experience.

"Frequently, permanent reliability comes down to the details," emphasizes Buchkremer, referring to the close collaboration with Aventics: "Even though the pneumatic components installed here at first appear insignificant, they are crucial to machine availability and aseptics. In addition to reliable components, we also need close contact and collaboration with suppliers based on partnership to detect optimization potentials in good time and drive improvements forward together."

An Aventics SSI series compact cylinder isolates sealing caps by moving them from one side to another. It sounds like a simple task, but it has to function precisely, around one million times a week in day-to-day operations. Based on concrete application data supplied by Elopak, the cylinder experts at Aventics reinforced the piston package, extending the cylinder's service life, which in turn has a positive effect on machine availability. Other cylinders move packaging forward up to the next processing step. Pressure varies depending on the position and amount of packaging on a rail. Here, the ED02 electropneumatic pressure regulator ensures precise, dynamically controlled pressure, enabling an optimized, energy-efficient process.



The Aventics HF03 series valve system is used in many Elopak machines.

In addition, hydrogen peroxide (H_2O_2) is used to sterilize the packaging, but has an effect on all reactive components,

including sealing materials and grease, which are standard for throttles. Here, choosing the wrong material poses a risk to the entire sterilization process in the long run.

"We worked with Aventics to find a suitable solution, and now use a throttle that has been cleaned on the inside, with a special sealing ring on the sterilization system's vaporizer. These design details allow us to achieve higher stability," states Johannes Platen, responsible for engineering and mechanical design at Elopak EQS.

Depending on the requirement, Elopak combines shut-off and ventilation valves to create the perfect solution, optimizing the compressed air system's energy efficiency. Compressed air treatment steps such as filtering, regulating, and dehydrating are already integrated in the AS maintenance units from Aventics and ensure high compressed air quality.

HO-impregnated air also resulted in an application-specific development here. To extend the valves' service life, valve specialists at Aventics combined a standard valve system with an aluminum corner strip including an all-round seal. Now, the valve pilots engage directly in the closed cable conduit within the machine, while the outlets exit the machine. This effectively prevents problematic contact between valves and hydrogen peroxide, contributing to optimized reliability.

The special unit consists of three Aventics components mainly aiming for machine safety to meet the required performance level. Combined with a soft-start and a blocking valve, an AS series maintenance unit offers an array of functions. After a safety cut-out and when the system is depressurized, for example by opening the doors, the valve systems should not be subjected to the full 6 bars of pressure immediately upon restart. The application-specific design now ensures the valve systems are slowly filled with compressed air.

Hygienic safety for series production

Aventics realizes such detailed solutions thanks to its many years of experience in designing hygienic components. This is reflected in numerous properties of the 'best-in-class' components customized specifically for utmost food safety. In plain terms, this means no recesses or sharp edges, easy cleaning and disinfection as well as the use of food-compliant materials and lubricants, and resistance to chemicals.

"Aventics provided Elopak EQS with support right from the start and knows what it means to monitor a near-series machine in development. The pneumatic components made a major contribution in the reliability and low-maintenance requirements of our innovative aseptic filling machine, not least for these reasons. This all boosts machine availability," said Buchkremer. "Furthermore, Aventics and Elopak support the VDMA initiative to standardize consumption measurement so we are on the same level when it comes to determining energy efficiency, able to implement this together to the user's advantage."

Elopak will also use the Aventics Advanced Valve series, which is optimized for future requirements for continuous data exchange from the control to the lowest field level. "This meets our desire to continue driving fieldbus technology forward, also in pneumatics," says Platen, adding: "This development, too, will be realized in close collaboration with Aventics." **PTE**

For more information:

Aventics (Emerson Automation Solutions)
Phone: (859) 259-3855
www.aventics.com

Elopak
Phone: +47 31 27 10 00
www.elopak.com