SET IT AND FORGET IT

Elopak equips first fully aseptic filling machine for gable top packaging with robust pneumatics from AVENTICS

Machines for filling milk or juice have to 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.” The 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.

Proven design: used in many Elopa machines, the CL03 series valve systems (using HF03 valves internally) will be gradually replaced with the new AV valve series by the packaging specialist.

Optimized, energy-efficient solution: The varying pressure when moving the packaging is precisely and dynamically controlled by AVENTICS ED02 electro-pneumatic pressure regulators.

“The latest technical features are not our main concern when selecting components.” With this statement, Wolfgang Buchkremer, Senior Manager Research & Engineering at Elopa EQS GmbH in Monchengladbach, has astonished some system suppliers. His greatest requirement focuses much more on reliability: “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 the first fully aseptic gable top system, Elopa is pursuing its strategy of ultra-functional packaging concepts, becoming a real trendsetter in the area of aseptic with its new Pure-Pak Advanced filling concept. It meets both increasing expectations of consumers regarding product design, functionality, and quality, and industry requirements regarding maximum efficiency and machine availability.

This makes the aseptic machine the next generation of the over 100 year old tradition of the Pure-Pak principle of Elopa, whose gable top packaging is known worldwide with around 13 billion cartons sold.
Based on this expertise, 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 packagingsizes of 500ml, 750ml, and 1l. 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.

A plus: The system has been optimized by Elopak so that it can easily be adjusted to accommodate different cartoon sizes. Since all machine processes are geared to the top height of the packaging, the users simply have to adjust the bottom height using the AVENTICS CCI compact cylinder when switching products.

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 as filtering, regulating, and dehydrating are already integrated in the AS maintenance units from AVENTICS and ensure high compressed air quality.

**INDUSTRY EXPERTISE TRANSFORMED INTO PERFECTION**

Taking cylinders as an example: 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 hasto function precisely, around 1 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. Further 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.
Taking throttle valves as an example: Hydrogen peroxide ($\text{H}_2\text{O}_2$) is used to sterilize the packaging, but has an effect on all reactive components, including sealing materials and grease, which are standard for throttle valves. 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.

Taking valve systems as an example: $\text{H}_2\text{O}_2$-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.

Taking quick exhaust and soft start valves as an example: 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 us at 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,” emphasizes Wolfgang 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 soon also use the 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 Johannes Platen, adding: “This development, too, will be realized in close collaboration with AVENTICS.”
ELOPAK: GLOBAL SUCCESS WITH PURE-PAK®

If your milk carton doesn’t spill or make a mess when you open it, the packaging is very likely from the Elopak Pure-Pak series. The leading global supplier of paper-based packaging solutions for liquid food products is headquartered in Norway and belongs to the Ferd Group. Elopak develops, produces, sells, and maintains complete systems for packaging non-carbonated liquid products, such as milk and dairies, juices, wine, water, and soups. Elopak is the best known supplier of gable top cartons with its Pure-Pak® brand. In 2012, the company and its joint ventures employed around 2,800 staff members, achieving sales of around 940 million euros and producing 12.8 billion beverage cartons.

Since 2011, Elopak EQS GmbH has been headquartered in Mönchengladbach, now employing around 130 staff. EQS stands for equipment supply and includes everything from machine construction to the development and production of pourer sealing systems.