For years, maximum throughput and highest quality standards have been the trademark of slitting machines from the Universal series, produced by the global market and technology leader Kampf. “Even though the machines are all tailor-made to customer requirements, they are all based on a common platform in principle,” explains Maik Krüger, product manager in chief at Kampf. “At the core is the solid and modular design, which we continue to develop further, fitting it to our customers’ rising demands. The close collaboration with Siemens allows us to realize innovative solutions in drive, control and regulating technology quickly and thus, to increase the customer benefits of our plants,” says Krüger.

The production speeds of film lines have more than doubled in recent years. Today’s cutting-edge production lines work at a speed of 600 m/min, and counting. Krüger adds: “The bandwidth of intermediate and end products manufactured by our customers today is great, which is why our slitters need to feature high flexibility with respect to the manufacture of roll widths and diameters for efficient operation”. The ideal combination of increasing production speed up to 1500 m/min, i.e. 90 km/h, while reducing acceleration time and downtimes brings along success – with absolute finished roll quality, of course.

Motor dimensions play a key role

To meet these challenges, Kampf has been working closely with Siemens for more than 30 years in the field of drive and control technology. With the specialists in the nearby Application Center Cologne leading the way, results of this cooperation are innovations in converter technology as well as a large number of motors, some of which Siemens produces exclusively for the company. Krüger stresses: “Every machine is fitted with 70 to 90 electric motors that are optimally designed for specific tasks in terms of performance and dimensions.” In addition to the significance of the drive, the dimensions play a key role, as the motors are positioned directly on the winders, and their installation width is crucial for the minimum slitting width that can be achieved.

Although the slitters require relatively little power compared to the upstream film production lines, energy efficiency is very important. Since all the drives of the Universal slitters are selected precisely to match customer requirements, the machine’s average power requirement of 30 kW is relatively low. And, as all the relevant motors at Kampf have fed the
energy recovered from braking back into the plant’s intermediate circuit since the 1990s, the machines’ energy demand has remained constant despite increased productivity. In fact, the Universal BOPP is currently the slitting machine with the lowest specific energy consumption.

At the same time, the throughput of production plants is continually increasing. Consequently, the machines are becoming faster and wider. Krüger says: “The current 525 m/min and maximum film width of 10.4 m means more productivity for the customer but also requires more space and complicates logistics. In further development of our machines we paid special attention to combine compact design and optimum material utilization.” In the case of the Universal series, we were able to increase the dynamic stiffness as well as accelerate the necessary plant velocity, and, by means of a changed design, to reduce the machine’s footprint significantly. This saves valuable production space and gives the operator a better overview.

There were also considerable improvements made in electrical engineering. Whereas 15 years ago, up to 19 control cabinets with an overall length of around 15 m were required to operate the motors, nowadays switching units with a width of less than five meters will suffice. This size reduction has been influenced by the further development of drive and control technology. Krüger adds: “Using Sinamics S120 we can connect up to two motors to one converter. This reduces installation costs, effort, and space requirements.”

Integrated automation

A speed of 1,500 m/min requires that all winding processes with their constant parameter changes be optimally monitored and controlled. To do this, all the converters are connected either directly or by distributed I/O modules, via Profibus, to a programmable logic controller (PLC) of the Simatic S7-300 line with external visualization.

For the Step 7 programming Kampf also relies on teamwork with Siemens. As soon as the customer has defined the requirements, the machine builder develops the appropriate concept and Siemens provides the necessary automation solutions. The machine manufacturer’s specialists then take over implementation. The result of the collaboration is an integrated automation system that enables the customer to configure the optimum slitting and winding sequences, sustainably shorten cycle times, and stay one step ahead of competitors when it comes to speed and product availability.

INFO AND CONTACT:
siemens.com/converting
karl-heinz.charles@siemens.com