

■ **Kristallglasfabrik Amberg GmbH, Germany**

Top Quality Every Two Seconds

A Simotion-based automation system rapidly increases the quality and cost-efficiency of tableware glass production.

The highest-quality machine-manufactured glasses from Riedel – the global market leader in quality wine glasses and decanters – are produced at the crystal factory in Amberg. Managing director Armin Reichelt says, “The best way to make use of our expertise to beat the competition is to focus our efforts on the industrial production of high-quality tableware glass.”

The factory’s second production line, which was previously configured for standard-quality tableware glass, has therefore been converted to the technologically more demanding blow-molding process. The company has also invested in a new 18-station blow-molding machine and retrofitted the production line’s stem press. Reichelt found ideal partners for the implementation of the new equipment in machine

supplier IPROTec GmbH & Co. KG and Siemens Solution Partner Schlemmer Prozess Systeme GmbH (SPS), which was subcontracted to design the Siemens automation system and program the entire system.

Continuity optimizes maintenance

For Hans Gruber, the head of the electrical department, simple and cost-effective maintenance is all part of process optimization. That is why he is eager for the company to use a single automation system in the medium term: “It’s no longer necessary to have numerous different systems for maintenance, servicing, repairs and procurement of spare parts,” he points out.

This is all the more true now that it is also possible to achieve continuity between the process control system

Solution Partner

Automation

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To increase capacity and flexibility in the production of top-quality glasses, the crystal factory in Amberg standardized the technology in its two production lines

and machine control. The PCS 7 process control system, for example, offers all the control functions required by the tableware glass industry. PCS 7 receives the relevant data from the WinCC flexible HMI system used in the machine, which allows motion control applications to be operated using Simotion D.

The continuity this achieves, from the control level to the drive level, considerably simplifies the standard processes, composition handling, quality control and system diagnosis.

Responsibility for the automation of the new blow-molding machine was awarded to SPS, which was previously commissioned with the retrofit of the glass stem press. One of the specifications was to make the familiar user interfaces correspond exactly to customer requirements. The developers at SPS therefore created ActiveX elements for the WinCC flexible RT HMI system that transfer the existing user interfaces to the new automation system.

Inter-project synchronization

The production line is now continuously automated using the Simotion D motion control system. The blow-molding machine and stem press automation projects incorporate a total of five CPUs and 51 servomotor axes with absolute value encode. All components are synchronized with each other in the inter-project synchronization process so that the entire production line now follows a uniform position control cycle. The CPUs are synchronized using Profinet IO with IRT (isochronous real time).

The blow-molding machine is designed in the form of a carousel on which the 36 servomotors and the majority of the I/O signals can be found, particularly the I/O signals with speeds timed to microsecond precision. The drives, the peripheral stations and one of the motion control CPUs are also positioned on the carousel for this purpose. Finally, the switch cabinets sit right on top of the blow-molding machine. Due to the microsecond precision of the fast I/O signals, data are transferred clock-synchronously between the stationary and rotary parts of the blow-molding machine using an equidistant Profibus at a rate of 12 megabits per second via an appropriately certified slip ring.

The modular design of the automation system is a great advantage, as it means that individual stations can be replaced with little interruption to production. The blow-molding machine can also be used without the stem press for the production of tumblers.

Rapid commissioning

Process downtime was limited to 14 days, so SPS carried out the precommissioning of all drives and axes on the SPS test bench in its development department during the software development stage. At the site of machine manufacturer Iprotec in Grafenau, Germany, a further precommissioning process was carried out by the mechanics in the form of a "dry run" without glass or connection to the stem press. "After just four weeks from the start of the conversion process, we have achieved the same throughput and the same product quality as we previously enjoyed after a six-to-nine-month lead time," says Reichelt, praising the development team and the machine.

The extremely short response time of the automation system to fast signals, a sensitive temperature control system and a high level of process consistency and reproducibility allow the production of glasses with a uniform wall thickness and a smooth transition to the stem. As a result, not only is the throughput higher – the system produces 30 glasses per minute – but the level of waste is also reduced. ■

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