GLASSFOCUS 2022

International trends and reference projects in the glass industry

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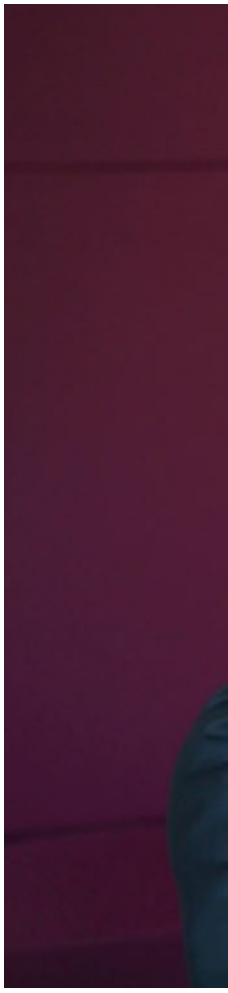

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BE FUTURE READY

A clear view of the **industry's needs**

The glass industry is focusing on sustainability more than ever, and on saving energy in particular. Tobias Wachtmann provides insights into how automation and digitalization solutions can strengthen the industry in its present situation. The 46-year-old is Head of Global Glass & Solar Business at Siemens in Karlsruhe, Germany, and his job is closely associated with the issues that are currently motivating all the stakeholders.

Mr. Wachtmann, over the past few years, in-person meetings have become rare. How were you and your team able to initiate or expand your business activities, and what were your experiences?

Tobias Wachtmann: Looking back, this period inspired a lot of activity. It acted as a catalyst for practicing new and even more digitally-oriented processes. Our regular interactions with customers, partners, and professional associations are essential to our everyday work. They're the only way we can translate desires into solutions. We discovered there are two sides to interacting on a screen. On the one hand, we no longer had to prepare for trips, and travel time was eliminated, which made us more flexible and efficient. On the other hand, our work intensified: a project meeting with Chinese customers in the morning, virtual participation in a glass conference in England in the afternoon, and countless Teams meetings in between. The biggest challenge was to provide the usual depth of information, because the length of video calls is usually limited and their content is often fixed. Having the kind of wide-ranging and creative conversations we might get in a "water-cooler moment" or at a business lunch suddenly meant having to schedule an extra meeting.

For those of us who haven't met you and your team – despite the many virtual opportunities – what should we know about the Siemens Glass Team?

Tobias Wachtmann: Our team is based in Karlsruhe and is so refreshingly different and so united in its passion for glass and glass manufacturing. What motivates us is the fact that we're able to make a difference in the industry. By "us" I mean a complex network of international colleagues: for example, colleagues in Erlangen, Germany, who provide machine builders in the glass industry with perfectly customized automation and drive solutions. We're in constant contact with stakeholders who are similarly motivated, which includes glass manufacturers, processors, machine builders, plant section suppliers, planners, system integrators, technology companies, and even representatives in research, science, and professional associations. Innovations can only be advanced and implemented in the broader context of the entire glass industry ecosystem. At Siemens, we've summarized this approach in the motto, "Clear view on glass."

What exactly does "Clear view on glass" mean?

Tobias Wachtmann: Our approach is to talk to all industry representatives on an equal footing. To do this, we need to acquire a clear view of what the individual stakeholders are concerned about, drawing on our profound knowledge of the industry and as experts in the fields of automation, digitalization, and security as interdisciplinary issues. The "clear view" also means an increasing reliance on data rather than experience. In other words, clarity through data, which first has to be collected, then evaluated, and finally interpreted.

This year in particular, your industry has hopes of obtaining a "clear view" because 2022 is the "International Year of Glass." What are you expecting?

Tobias Wachtmann: We're looking forward to having attention drawn to an essential industry whose products are often taken for granted much like the air we breath – or are even totally

Tobias Wachtmann has been Head of Global Glass & Solar Business at Siemens in Karlsruhe, Germany, since June 2020. The 46-year-old began his career with the company in 2000. After training in industrial technologies, he occupied many positions in Sales at the Siemens subsidiary in Cologne. In 2012, he transferred to the process industries headquarters in Karlsruhe, where he began enthusiastically supporting customers in the glass industry. Since 2017, he has worked in Vertical Glass & Solar specializing in Account Development.

unknown. Everyone drinks out of a glass without even thinking about it, or looks through a window. But not everyone realizes that an air bag has a glass seal and that a space telescope relies on this same miraculous material. We're also hoping to highlight many technological refinements, from the nano effect and integrated electronic shading and targeted light to radio wave transparency in panes and all the different types of glass. It's also more important than ever that as representatives of the industry we call attention to how sustainable glass is, especially through recycling. Close to 100 percent of the material can be reused in the manufacture of new glass products, and recycled glass currently accounts for up to 90 percent of the raw material used in a glass melt. This also significantly reduces energy requirements.

Doesn't sustainability also mean safeguarding jobs and making them more attractive?

Tobias Wachtmann: Thank you for mentioning that. The German machine builder Waltec is an example of how a win-win situation can be turned into a win-win-win situation. For decades, the company has been innovating its glass presses side by side with Siemens. As a result, it's been able to offer glass tableware manufacturers like Trend Glass exactly what they need: sustainable concepts like fully electric e-servo presses. Since Trend Glass has been using the fully electric version, employees have been working in a healthier environment, thanks to the absence of oils. They're also finding it much easier to operate the less complex machines.

The keyword is decarbonization. What are the concepts that are necessary today to ensure a secure future for this energy-intensive industry?

Tobias Wachtmann: Decarbonization is essential. It's important that we actively develop melting technologies that are less dependent on gas and oil. To achieve a carbon-free economy, we need to consistently make the switch from fossil fuels to alternative energies without endangering the security of supply: for example, by making sure that storage media are available. This is an extremely complex task. Take the examples of our customers Wiegand-Glas and Heinz-Glas in Bavaria: Heinz-Glas estimates that it could become less dependent on the energy market if it owned ten wind turbines. It's a concept that seems realistic, but when you try to scale it up, you realize there are limits. Wiegand-Glas has calculated that it would need 100 wind turbines for instance. And even just the glass companies in the region around Heinz-Glas and Wiegand-Glas collectively consume the same amount of electricity as a city of 400,000 people. And because the furnaces operate around the clock, wind energy also needs to be stored to cover windless days. This is where hydrogen comes in, although its production also requires electricity from renewable sources or natural gas. Despite the obstacles, this was the path chosen by our Slovenian customer Steklarna Hrastnik. The company uses solar energy to generate green electricity for producing and storing hydrogen, which is added to the natural gas used for the glass melt. Steklarna Hrastnik's goal is to replace 50 percent of its primary fuel with hydrogen, which would reduce its greenhouse gas emissions by about 20 percent in the medium term. We see these as promising initiatives that need to be actively promoted in collaborations with research, business, and politics.

This still doesn't reduce the amount of energy used. What approaches do you see for conserving energy?

Tobias Wachtmann: We believe that the cornerstone for all improvements is having an end-to-end, state-of-the-art technological foundation for production operations. Integrated automation

is practically a necessity – it's not optional. For example, Wiegand-Glas, which is located in Schleusingen, Germany, and is one of Europe's most advanced container-glass factories, relies on an integrated automation concept that employs Siemens' Simatic PCS 7 process control system. When you have this foundation, you can implement a variety of software-based solutions: for example, to increase energy transparency and efficiency. But you can't do that on a generalized basis as some kind of cure-all – you need to carry out an analysis first. Each company has its own goals and requirements, so our aim isn't to sell specific software but rather to provide our customers with comprehensive advice on what technological resources make sense given their particular objectives.

Can you give us some examples?
Tobias Wachtmann: The glass packaging manufacturer Vetropack, for example, wanted to implement a globally standardized and interconnected system for energy management and procurement. Its requirements ranged from planning and strategic procurement to recording consumption and auditing, all of which could be covered by our holistic approach using the Simatic Energy Manager PRO energy management system and add-ons for the structured procurement of energy. The Austrian glass manufacturer Stoelzle is having similarly positive experiences with the software. The company's goal was to reduce energy consumption by 20 percent. According to Stoelzle, knowledge provided by the energy management system alone was responsible for a three to five percent reduction.

How do you take what's probably the most challenging step, adopting the holistic approach of Scope 1, 2, and 3?
Tobias Wachtmann: Scope 1 covers direct emissions from sources that a company owns or controls. Scope 2 covers indirect emissions from the generation of electricity, steam, heat, and cooling that the company buys and consumes. Scope 3 is all other indirect emissions produced by a company's value chain. Siemens has developed an ecosystem-based approach for exchanging emissions data. At the end of 2021, we launched our first solution for querying, calculating, and transferring information on the actual product carbon footprint (PCF). SiGreen makes it possible to exchange emissions data along the supply chain and combine it with data from a company's own value creation in order to obtain a product's true carbon footprint. To achieve this, Siemens initiated the open, cross-industry Estainium network with the goal of enabling manufacturers, suppliers, customers, and partners to exchange trustworthy PCF data. With SiGreen to support them in tracking their product carbon footprint, companies can take targeted reduction measures that deliver a quantifiable effect. After all, the supply chain accounts for a major proportion of product-related emissions.

Does Siemens also apply a decarbonization approach?
Tobias Wachtmann: Yes! To limit global warming to 1.5° Celsius, we're committed to a science-based reduction pathway along our entire value chain. This is how we'll ensure that our climate protection efforts are in harmony with the Paris Climate Agreement's highest level of ambition. Our goal is clear: All Siemens production facilities and buildings worldwide will achieve a net zero carbon footprint by 2030. We're already developing energy-efficient products with a low carbon footprint, from energy-saving motors to fanless electronics modules and the corresponding procurement of components with an optimized footprint.

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Our approach is to talk to all industry representatives on an equal footing. To do this, we need to acquire a clear view of what the individual stakeholders are concerned about, drawing on our profound knowledge of the industry and as experts in the fields of automation, digitalization, and security as interdisciplinary issues.

Tobias Wachtmann
Head of Global Glass &
Solar Business at Siemens

Are there any specific examples of digitalization solutions that are already delivering measurable benefits today?

Tobias Wachtmann: Let's take the far-reaching possibilities of simulation. Because the specialty glass manufacturer Schott was planning a new construction facility to expand plate-glass production at its site in Bolu, Turkey, the company was able to rethink and calculate processes, material flows, logistics workflows and, most importantly, all what-if scenarios beforehand. The experts benefited from their own experience and from Siemens' Tecnomatix Plant Simulation software. With a virtual twin of an entire production plant, Schott was able to prevent misdirected investments and save resources. Here's another example

from our customer Schott. For the first time, the company linked numerous simulation tools together prior to building a new machine. Before the loader of raw glass for the ceramic-glass cooktop production process was actually built, Schott used digital twins to simulate engineering and control as well as a behavioral model, kinematics, and machine commissioning. The many benefits that were generated are literally paying for themselves. This project was the first time Schott linked its existing and proven Process Simulate robotics simulation software to Create MyVirtual Machine/Operate software, which was new to Schott. Simit software from Siemens – which already had a long track record at Schott – served as the link between Create MyVirtual Machine/Operate and Process Simulate. More developments by the machine builders and plant engineers themselves ensure that glass manufacturers can take advantage of significant innovative advances, as the examples of Forvet, Sklostroj, and Fama demonstrate.

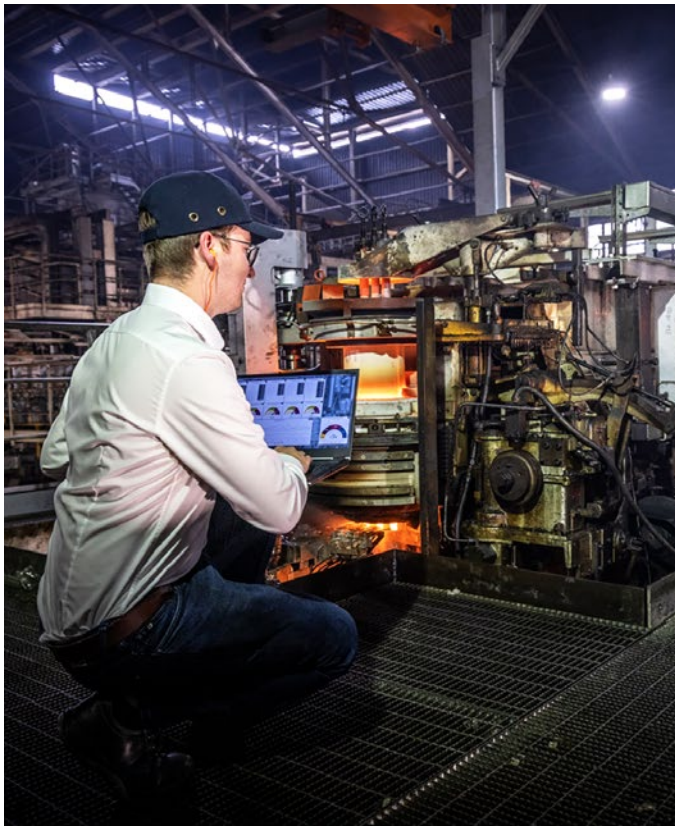
With so many options, how can customers know which solution is right for them?

Tobias Wachtmann: That's a complex issue, so we recommend that our customers start by taking part in what we call Digitalization Consulting. We meet in workshops and closely examine the company's goals and market requirements. Are they looking for more flexible production? Greater efficiency? Reduced costs? Higher quality and/or sustainability? Our teams apply all their experience in a comprehensive discussion of these issues. They combine industry-specific knowledge on everything from raw materials to the finished product with expertise that extends to the field, automation, process, and corporate management levels and includes specific associated IT requirements. Our customers also benefit from a broad-based partner network. Just look at the examples of Horn Glass, Zippe, and Grenzebach, with whom we're working very closely on future issues. The consulting I mentioned results in the creation of a digitalization roadmap that examines, highlights, and evaluates specific requirements, business models, and existing infrastructures (IT and OT). Using this roadmap as a basis, digital transformation can be implemented according to a plan. In addition to digitalization options, it also contains ROI calculations. What you end up with is a transformation into a digitally operating company – a transformation that the glass businesses can implement themselves. On our part and at the customer's request, we offer an integrated solution portfolio comprised of hardware, software, communication, security, and services. Many customers have already traveled this path with us, including Guangdong Huaxing Glass in China and Steklarna Hrastnik in Slovenia.

Mr. Wachtmann, thank you for sharing these interesting insights!

More on the references

GLASS CONTAINER MANUFACTURING



Köflach, Austria and worldwide

Stoelzle Glass Group

For over 200 years, the Stoelzle Glass Group has been manufacturing high-end glass containers for the pharmaceutical, perfumery and cosmetics, spirits, and food and beverage industries. Based in Köflach, Austria, what sets this company apart is a strategic plan to reduce energy consumption by 20 percent at all seven of its production sites and cut its carbon emissions in half by 2030. The centerpiece of this cross-factory process and energy optimization in production is the Simatic Energy Manager PRO energy management system – which, according to Stoelzle, is solely responsible for three to five percent of its energy savings. All the European factories will be connected to the system by the end of 2022 – without having to interrupt operations. For this initial large-scale collaborative project, Siemens offered an impressive overall solution that included everything from consulting to implementation of software and hardware from the field level to the management level.

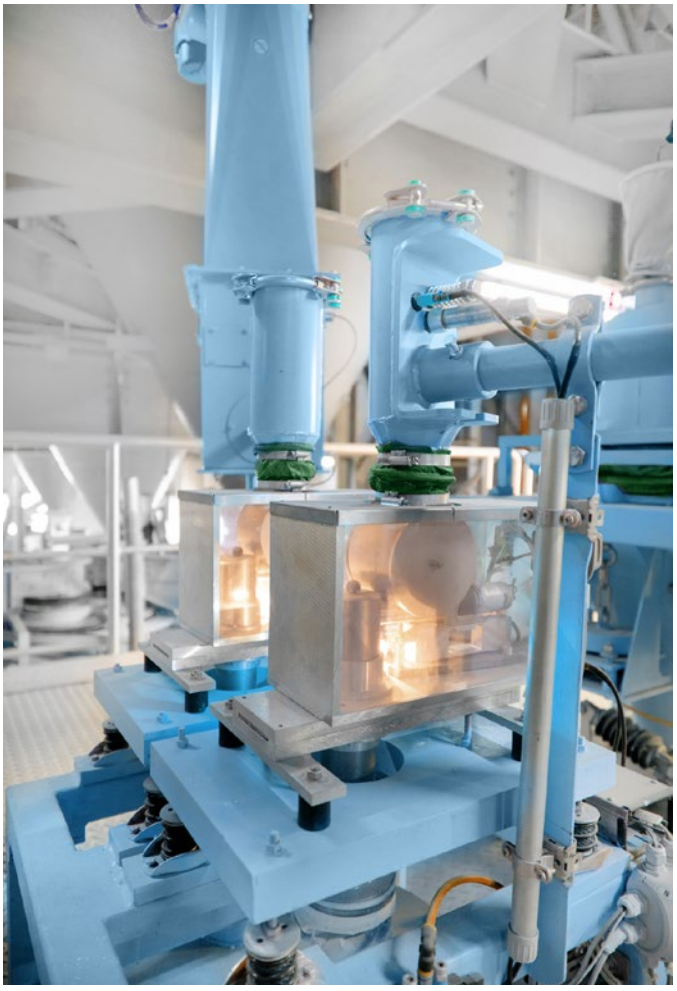
GLASS CONTAINER MANUFACTURING

Switzerland and worldwide

Vetropack Group

The Vetropack Group is taking strategic, economic as well as technical factors into account for its energy management and procurement. In doing so, it is relying on external consulting expertise and using the energy management system Simatic Energy Manager PRO, including add-ons for structured energy procurement. The goal is to comprehensively manage energy throughout the Vetropack Group, from planning and strategic procurement to monitoring consumption and invoice verification. The goals of the Swiss packaging glass manufacturer will be achieved after the rollout in all of its nine international factories.

BATCH PLANT TECHNOLOGY



Germany and worldwide

Zippe

For some decades, ZIPPE Industrieanlagen GmbH has concentrated on top-quality batch and cullet systems. Thanks to this solid foundation, the Siemens Solution Partner considers itself well equipped to tackle the challenges on global markets in unsettled times. One particular challenge has been continuing to carry out assembly and commissioning activities in other countries, which it has primarily done remotely. The company is all the more fortunate that it has also been able to realize local flagship projects in Germany, which are easier to travel to. Good examples are the projects for Wiegand-Glas in Schleusingen and for Noelle + von Campe in Boffzen, whose systems are now all in operation.

HOT-END EQUIPMENT CONTAINER GLASS

Czech Republic and worldwide

Sklostroj

The Czech machine and equipment manufacturer Sklostroj believes that container-glass forming technology can make a significant contribution to climate-neutral, energy-efficient glass manufacturing. According to the specialist in IS machines and hot-end equipment, the key is a comprehensive approach that combines reduced downtime, a consistent use of energy-efficient actuators, and digital twins used in a variety of scenarios. When it comes to electrification, automation, and digitalization, Siemens has been Sklostroj's technology partner of choice for more than 15 years.

More on the references

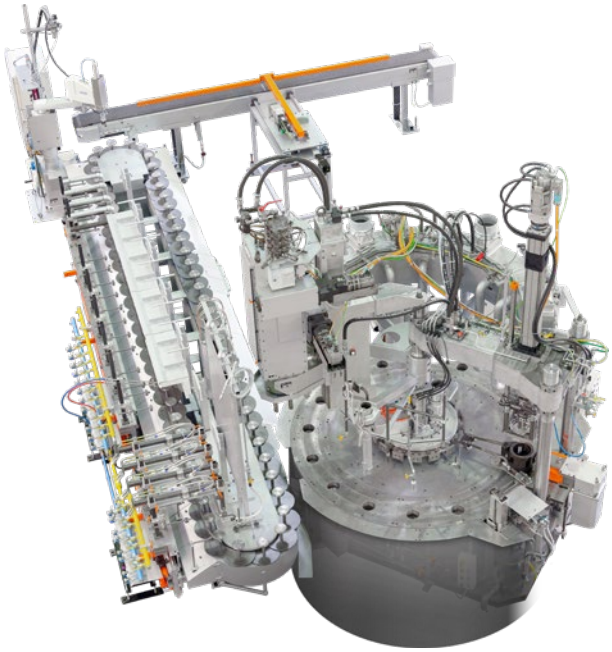
GLASS MANUFACTURING TECHNOLOGY / GLASS MANUFACTURING

Germany / Poland

Waltec / Trend Glass

The German machine builder Waltec is a good example of how a win-win situation can be transformed into a win-win-win situation. For decades, the company has been innovating its glass presses side-by-side with Siemens. As a result, they've been able to offer tableware manufacturers like Trend Glass exactly what they need: sustainable and increasingly digitalized concepts like fully electric e-servo presses in conjunction with data and analysis services.

The melting process is responsible for up to 85 percent of the energy consumption in the manufacturing process, depending on the type of glass and the production method. The machine builder Waltec is an example of how it also pays to look for potential savings in the remaining 15 percent. This medium-sized enterprise based in Bavaria, Germany, specializes in sustainable process optimizations at the hot end, with a focus on fully automated carousel-type machines for pressing tableware.



FLAT GLASS PRODUCTION

Turkey

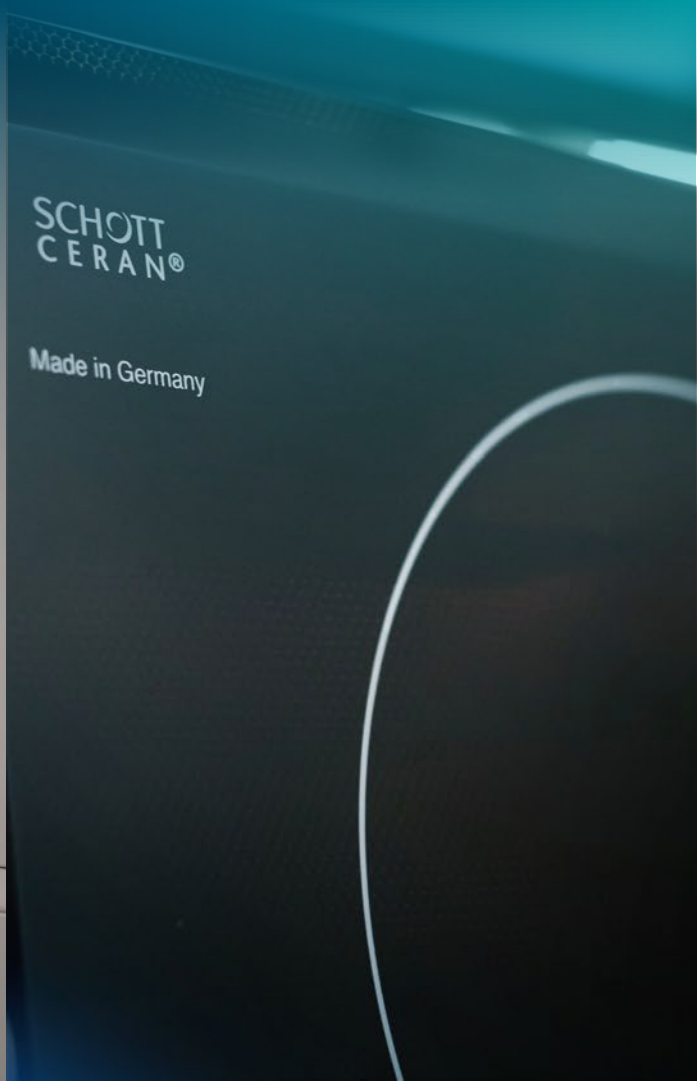
Schott

Planning a new construction facility to expand flat glass production at its site in Bolu, Turkey, gave Schott a great opportunity. The specialty glass manufacturer was able to rethink and calculate processes, material flows, logistics workflows, and most importantly, all the what-if scenarios beforehand. The glass experts benefited from their own experience and from Siemens' Tecnomatix Plant Simulation software as a digital assistant. As a result, optimized production at the highly flexible flat glass processing factory for the household appliance industry became a reality in spring of 2022.

CERAMIC GLASS PRODUCTION

Germany

For the first time, Schott has linked numerous simulation tools together prior to building a new machine. Before the loader of raw glass in the ceramic glass cooktop production process was actually built, Schott used digital twins to simulate engineering and control as well as a behavioral model, kinematics, and machine commissioning. The numerous benefits that resulted have literally paid for themselves.



More on the references

GLASS CONTAINER PRODUCTION

China

Guangdong Huaxing Glass

The numbers speak for themselves: The annual production capacity of the 15 factories totals almost four million tons of container glass, making Guangdong Huaxing Glass Asia's largest hollow glass manufacturer and a major league player at the global level. Thanks to support from Siemens, the company's comprehensive digital transformation also follows a clear strategic plan that's all the more effective on this scale. The tangible result of about two months of on-site consulting was a product-neutral automation and digitalization roadmap with a five-year plan and return-on-investment calculations.

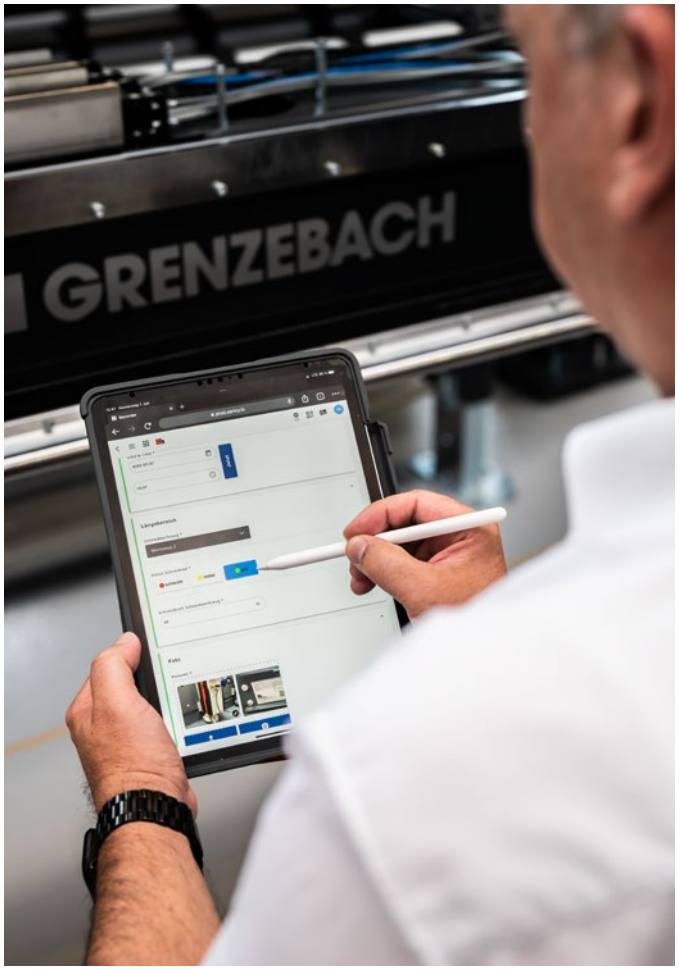
GLASS MELTING SOLUTIONS AND SERVICES

Germany and worldwide

Horn Glass

The Siemens Solution Partner Horn Glass provides a full-range portfolio of hot-end equipment for hollow glass, flat glass, and solar glass production plants. By using Siemens components for process instrumentation, analytics, drive systems, and PLC systems up to Simatic PCS 7 with integrated F-Safety, Horn Glass has acquired decades of experience with automation technology and has consistently improved the efficiency of the systems/machines it supplies in terms of their reliability, effectiveness, failure safety, system security, and cost savings.

GLOBAL AUTOMATION PARTNER



Germany and worldwide

Grenzebach

Grenzebach and Siemens have long enjoyed a close partnership when it comes to automation programming. The two companies are now intensifying their excellent cooperation in intelligent applications such as braid optimization in the float bath or in the sale of apps such as the Recorder App. The approach here is to think in terms of partnerships and open ecosystems – worldwide.

FLAT-GLASS PROCESSING

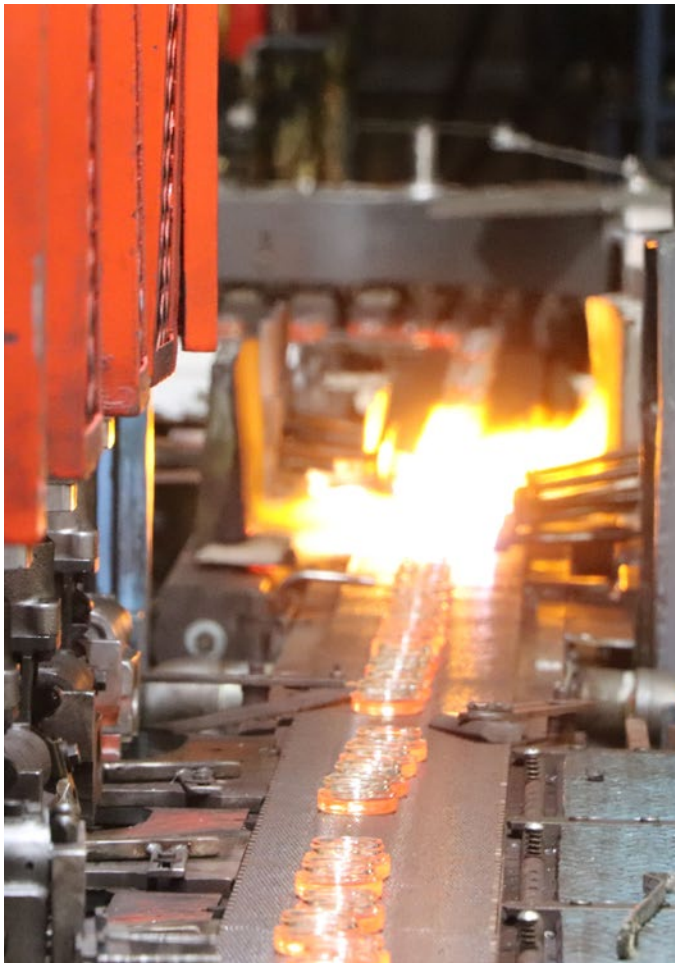
Germany and worldwide

Forvet

Forvet, an Italian manufacturer of special machinery, can truly do it all in the field of flat-glass processing. The systems engineering company has increasingly integrated all its processing steps into consistent, end-to-end complete systems and lines at the cold end in order to reduce throughput time and boost output. One of the newest elements in support of an optimized material flow is Sortiflex, an extremely compact system that doesn't just (temporarily) store and buffer glass in patented double-deck racks – it can also sort and convey the glass to the tempering furnace while also saving energy. To operate this system, Forvet is once again opting for a finely tuned and highly flexible motion control system from its long-time partner, Siemens, that consists of a controller, drives, and motors.

More on the references

GLASS INDUSTRY EQUIPMENT



Mexico and worldwide

Fabricación de Máquinas

Because IS machines are known to play a key role in bottle production, the Mexican glass industry equipment supplier FAMA took its conversion from pneumatic to full servo machines as an opportunity to use simulation tools for the first time. Thanks to the digital twin, engineering time was cut in half and actual commissioning was also greatly accelerated. All this was based on a coordinated motion control system consisting of a controller, converters, and motors that also came from Siemens.

CONTROL AND AUTOMATION TECHNOLOGY

Germany

Atlantique Automatisierungs-technik

The main business areas of Atlantique Automatisierungstechnik GmbH are electrical design, switchgear, and test equipment in the field of control and automation technology. The company was commissioned by a customer to convert a flat glass grinding and polishing machine from Simatic S5 to Simatic S7-1500. The standard application Line Motion Control LLnCtrl was used. Atlantique Automatisierungstechnik was able to bring major components of this 30-year-old machine up to date with a current solution from Siemens.

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