



SIEMENS



Up to **25%**
reduced operating costs
through plant-wide
automation

Up to **50%**
shorter time to market
thanks to virtual plan-
ning and commissioning

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GlassFocus 2014

International trends and reference projects in the glass industry –
Sustainable success with plant-wide automation

Answers for industry.



Focus on sustainability

Responding to customer needs

Siemens offers plant-wide automation for the glass industry. The concept is designed for long-term success throughout the entire lifecycle of a production plant – including planning and services.

Siemens puts its focus on its customers and on the future: the group is reorienting its activities in line with the growth areas of electrification, automation and digitalization. The glass industry stands to benefit from new divisions such as Process Industries and Drives, Digital Factory, and Financial Services. With these additions, Siemens will be in an even better position to respond to the needs of its customers – and ensure their competitive edge.

A full portfolio from a single source

Plant operators and machine and plant manufacturers will be catered to better than ever by a portfolio that enables plant-wide automation throughout the entire lifecycle of a production plant – including planning and services. With its plant-wide automation concept, Siemens integrates all manner of automation solutions from various machine and plant manufacturers in a single, plant-wide total automation system, all along the value chain. The modular

complete solution encompasses automation, drives, instrumentation and energy technology, as well as IT, digital planning and services.

Extensive industry knowledge

The groundwork for plant-wide automation based on the process control system Simatic PCS 7 is provided by Siemens' established system architecture TIA (Totally Integrated Automation) and TIP (Totally Integrated Power), with products and systems for optimized power distribution. This is combined with the extensive industry experience of Siemens' glass experts, from the batch house and the cold end, all the way to processing, and supply and auxiliary facilities. In short: Siemens specializes in the plant-wide integration of machines and plant sections in a total automation concept, offering its customers a great number of advantages.

Advantages of plant-wide automation

What exactly are the benefits of plant-wide automation? As glass manufacturers, investors, general contractors, machine manufacturers and systems integrators all appreciate, Siemens' plant-wide automation perfectly balances out an array of important aspects. The result is a sustainable concept that incorporates economic and environmental aspects, while fostering valuable partnerships. In the following pages, GlassFocus shows readers how this holistic approach spans the entire lifecycle of a glass manufacturing plant – starting with consultation in the early planning phase, all the way to production and comprehensive global services.

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Advantages of plant-wide automation

For glass manufacturers

- ▶ Sustainable profitability
- ▶ Increased productivity
- ▶ Cost and energy efficiency
- ▶ Quick time to market
- ▶ More flexibility
- ▶ Greater transparency
- ▶ Consistency in the plant
- ▶ Leading innovation

For machine manufacturers

- ▶ Protected expertise, independent site acceptance test and commissioning
- ▶ Less time required for engineering, commissioning and integration with Siemens standards
- ▶ Simulation
- ▶ Reliable, easy and cost-effective remote maintenance
- ▶ Product lifecycle services
- ▶ Flexible expansion with innovative solutions
- ▶ Extended lifecycle service: modernization, update/upgrade services

Further information at
[siemens.com/glass](https://www.siemens.com/glass) and
on the following web pages:

Planning:

PLM-Software
[siemens.com/plm](https://www.siemens.com/plm)

Comos
[siemens.com/comos](https://www.siemens.com/comos)

Integrated Engineering
[siemens.com/comos-pcs7](https://www.siemens.com/comos-pcs7)

Automation technology:

Process automation
[siemens.com/process-automation](https://www.siemens.com/process-automation)

Totally Integrated Automation
[siemens.com/tia](https://www.siemens.com/tia)

Drive technology:

[siemens.com/drives](https://www.siemens.com/drives)

Instrumentation technology:

[siemens.com/sensors/glass](https://www.siemens.com/sensors/glass)

Industrial switching technology:

[siemens.com/sirius](https://www.siemens.com/sirius)

Services:

[siemens.com/industry/lifecycle-services](https://www.siemens.com/industry/lifecycle-services)

Financial Services:

[siemens.com/financialservices](https://www.siemens.com/financialservices)

Sustainable planning



Siemens assists plant operators, investors and general contractors right from the early planning phase, ensuring everything is in place for an end-to-end integrated system. As industry experts know, glass plants consist of a variety of plant sections provided by various machine and plant manufacturers. Often, plants are comprised of components from a multitude of manufacturers, with a range of protocols, to name but two factors. Siemens firmly believes that all concerned can benefit immeasurably if the various plant units feature the same hardware and software, with clearly specified interfaces. This makes connection to a higher-level process control system easy to implement, and ensures data continuity throughout the entire plant. Right from the planning phase, the groundwork is in place for all involved in planning and implementation to work together toward this goal.

When it comes to planning, not only does choosing the right partner make all the difference – the right software is also essential, as time to market must be as short as possible to keep a competitive edge. In the planning and design phases, Siemens supports machine manufacturers with Product Lifecycle Management (PLM) software such as the product development solution NX, or the Tecnomatix range of process planning software. This allows users to plan, simulate, analyze and optimize their production process.

All this allows for well-founded decisions and ultimately results in optimized products. Experience has shown that using simulation tools from Siemens can allow an increase in productivity of up to 20 percent, as well as a reduction in planning investment of 20 percent. A shorter design and engineering phase leads to products coming onto the market up

to 50 percent more quickly. Simulation software optimizes production and also minimizes costs throughout the entire lifecycle of a plant. With its plant engineering software Comos, Siemens offers the ideal solution for planning plant sections, enabling end-to-end planning for machines and plants, all the way to realizing complete plant-wide automation.



Sustainability up close

Time to market is cut by up to half thanks to virtual planning and commissioning.

Sustainable production



Sustainability up close

The average amount of recycling glass in new glass packaging is approximately 60 percent.

Plant-wide automation is also highly advantageous in day-to-day production. Although the initial investment is slightly higher, the plant's operating costs are significantly lower over a lifecycle of often up to 25 years. This means greater profitability – especially if the growth potential in the glass market is tapped. Currently, there is a strong demand for special glass that offers specific additional functions through individual manufacturing and processing techniques. An example is variable tint glass, which can change from transparent to opaque as required. This glass can be used as a flexible divide for optimum privacy in office spaces, for example.

In addition to cost efficiency linked with growth, the glass industry is also concerned with energy efficiency. Manufacturers and suppliers are striving for the efficient use of energy to ensure productivity and reduce costs, particularly in the

batch house and hot end. Global competition, rising prices of raw materials and energy, and environmental regulations all make resource-saving approaches unavoidable. This can now be seen in the industry across the globe. At the same time, glass products must continue to be of the highest quality.

Operators can counter rising energy costs with optimized production processes and energy-saving technologies. Similarly, quality is also assured by improved production processes, combined with high-quality raw materials. The process control system Simatic PCS 7 provides the glass industry with an answer for both of these central demands. PCS 7 prevents instabilities in the melting process, for example, and therefore also eliminates the energy losses this causes. Further potential for sustainable operations can be found in preheating the melting charge or using waste heat. The waste heat produced in

the glass production process can be used to generate energy to cover the plant's requirements. A compact steam turbine transforms the waste heat from the melting furnace into electricity. Exchanging outdated and inefficient units can also save energy; speed-controlled motors offer an ideal solution. Sinamics frequency converters, for example, can be used in the glass industry to recover energy and feed it back into the grid as braking energy.

As one of the world's leading suppliers of drive systems, Siemens has an extensive portfolio for increasing energy efficiency. Siemens also provides solutions for all areas of energy distribution: power distribution boards, trunking systems, intelligent solutions for power management, and protection, switching and measuring devices – all from a single source. This area is rounded off by switching technology for low, medium and high voltages. Siemens also offers weighing technol-

ogy, and process instrumentation and analytics for precise measurements of stages in the glass manufacturing process, as well as emissions measurements and integrated communication with the system control.

To ensure operators have a clear overview at all times, Siemens has developed a valuable software tool: Simatic powerrate. It records all energy-related consumption data in a plant, assigns it to the consumer, and also visualizes and saves the data. This is a highly effective way of detecting energy-saving potential. The software standardizes, visualizes and archives mean values for energy quantities and power loads, and reduces energy costs by capping power peaks.

In order to optimize production, system operators must have a thorough understanding and overview of the processes involved. Central data storage from Siemens offers glass manufacturers the transparency they need. For example, they can see how much energy and raw materials the plant consumes, and where exactly these are consumed. From this, they can discover ways to improve efficiency in the plant's operations. Thanks to central data storage, the manufacturer is kept well informed of the precise status of their plant. This is important for ensuring availability – and for uninterrupted operation in the melting furnace, even when it has been operating for well over 15 years. Repairs and preventative maintenance can also be scheduled in plenty of time, and adapted to suit the actual requirements. The Siemens concept also includes a consistent operating and monitoring philosophy, as well as uniform user interfaces throughout the entire plant. This reduces the workload for engineering, commissioning and training.



Siemens not only supports its customers with technological solutions, but also offers specialist expertise. The experience and competence of specialists has become an important factor for success in global competition. After all, it takes a specialist to exploit a plant's full potential for optimization: a specialist knows which modernizations are worthwhile, what to be aware of when it comes to innovations, and where the greatest amount of energy can be saved.

In response to its customers' wide range of needs and requests, Siemens offers an extensive service portfolio throughout the entire lifecycle of a plant: from planning and engineering all the way to the operating phase and modernizations. This includes energy audits, telephone support from Siemens specialists for urgent problems, and assistance for financing new machines and plants. The Siemens spe-



cialists are ready to assist with any requests their customers may have. They provide support for one-off projects, or as part of a service contract, all at projectable costs.

This comprehensive approach to sustainability is rounded off by Siemens' commitment to its role as a partner and specialist for the glass industry. Siemens is dedicated to long-term and trusting cooperation with its partners and customers across the globe: whether for regional modernization plans, or for major international projects involving renowned machine and plant manufacturers from around the world. Siemens has consistently demonstrated this dedication in its role in day-to-day operations in the glass industry for over 150 years. Now in its seventh edition, GlassFocus presents a selection of Siemens' current reference projects and pioneering developments that attest to this dedication.



Sustainability up close

Through plant-wide automation, operating costs can be cut by up to 25 percent.



Stefan Grenzebach,
CFO and Head of
Global Glass Sales at
Grenzebach Group

A foundation for the future

Stefan Grenzebach, CFO of Grenzebach Group and Head of Global Glass Sales, draws on several decades of experience in the glass industry to drive innovation.

What about your customers – what are their main concerns?

Grenzebach: When it comes to making investments, our customers are chiefly concerned with the cost-benefit ratio and product quality. What sets Grenzebach plants apart is their exceptionally high availability, long life cycles and quality. They guarantee high yield over many years and outstanding product properties. Our customers are globally active groups that expect consistent quality and availability from us around the world, as well as reliable, fast service.

How long has Grenzebach been active in the glass industry?

Grenzebach: Grenzebach has been active in the float glass business from the very beginning – since 1974. We started out as a machine supplier, developing over the years into a complete solution provider. We have continually updated our products and business, ensuring the very latest in quality standards with cutting-edge technology.

What innovations in the glass industry has Grenzebach contributed to in its long history?

Grenzebach: Highest-precision glass cutting, our optimization computer for increasing float plant yield, handling processes for ultra-thin plates and plates coated

with sensitive layers, and manufacturing processes for photovoltaic, display and coated glass, including complex transport and handling systems.

Siemens and Grenzebach have cooperated as development partners for many years. How would you sum up the partnership?

Grenzebach: We worked closely together to develop new products such as plant-wide control concepts. We have collaborated on many occasions on innovative concepts, with Siemens producing the necessary components and, in cooperation with Grenzebach, integrating them into control structures. This led to the launch of components – in consultation with Grenzebach's customers – long before they became the international standard.

Siemens advocates the concept of plant-wide automation. What responses have you received from glass manufacturers?

Grenzebach: Siemens and Grenzebach presented the idea to customers two years ago at the glasstec trade fair. The response we received was that it is the right direction for the industry, and that it will have an important role to play in glass production in the future.

Mr. Grenzebach, thank you very much for the interview.

Mr. Grenzebach, you've headed up global glass sales at Grenzebach since early 2014. What are the main challenges you face at the moment as a supplier to flat glass manufacturers?

Stefan Grenzebach: The market price for glass has fallen in recent years, and we are feeling this pressure from producers. At the same time, investments are being delayed, which of course means an increase in competitive pressure for new lines. Nonetheless, glass will always be a highly desirable material, and new and exciting applications are emerging continually. Depending on the application, glass has to be thicker, thinner, larger or simply of better quality.

Paving the way for Industry 4.0

Roland Jenning, Head of Research and Development at Grenzebach, on how plant-wide automation is paving the way for the Industry 4.0 strategy.

“After mechanization, industrialization and automation, we now face the fourth industrial revolution today: the so-called Industry 4.0. A central element of this is cyber-physical systems – that is, intelligent objects equipped with their own decentralized control systems, which can exchange data automatically in a network and control themselves independently. The industry is undergoing changes. One of the main features of current technological advancements is the comprehensive networking of all components. At Grenzebach, we have always used the latest available technology and created value for our customers with cutting-edge manufacturing and control technology. Siemens has stood by our side in this as a valuable partner over the years.

Requirements of glass products have changed considerably in recent years. Today, the market demands high-quality glass with specialized functions. With its tried-and-tested, high-precision mechanical systems, combined with the latest automation and process technology, Grenzebach currently supplies plants that produce glass for mobile phones, smartphones, tablets, TFTs, touchscreens and solar panels. Grenzebach is one of the few companies worldwide that provides systems for all areas of glass manufacturing: from small glass

products for mobile phones to large 16-meter plates; glass thickness of three centimeters to well under a millimeter; and plates weighing just a few kilos to up to several tons.

We achieve high quality through optimized glass inspection, and through data handling that analyzes glass quality in all plant sections and provides central reporting. We don't just address the cold end, but increasingly also hot-end processes. As our partner, Siemens helps us to achieve this by enabling us to analyze the entire process, to draw conclusions centrally, and to document and act on these conclusions. This is where the advantages of plant-wide automation really pay off.

As a solution provider, Grenzebach has already created the right environment for the networking required. As a one-stop shop, we supply both equipment and automation. Thanks to our experience and expertise in process and control engineering, and our cooperation with reliable partners, we have the technology it takes to ensure machines and robots can see, feel, handle and communicate. And so we have paved the way for Industry 4.0 with networked machines and reliable, plant-wide intelligent automation.”



All photos: Grenzebach

Roland Jenning, Head of Research and Development at Grenzebach, an innovative partner for the glass industry. Grenzebach is headquartered in Hammlar in Swabia, Germany. The high-tech company plans, produces and supplies complete plants for manufacturing and processing continuous glass sheets with industrial automation for process monitoring and quality inspection.



Sustainability up close

Sustainability is a top priority in a number of areas at Grenzebach. For example, right from the design phase Grenzebach engineers focus on lower energy consumption and optimum energy efficiency in their systems. With its pioneering production facilities for the solar industry, the company is helping to make renewable energy more cost effective, and therefore supports the transition to sustainable energy sources. At the same time, it is important to Grenzebach to create good working conditions for its staff members. Grenzebach provides training far beyond the statutory requirements, while also improving educational opportunities in the region through close cooperation with schools. This social commitment was rewarded in 2012 with the Donau-Ries district's first-ever Business Culture Prize. In 2014, Grenzebach ranked among the TOP100 employers in Germany.

Keeping the fires burning

UAS and Zippe proved to be the perfect team for upgrading the glass packaging specialist Vetropack's works in Saint-Prex, Switzerland. The existing PCS 7 concept was brought up to date during ongoing operations, and plant-wide automation was installed that can even be used across facilities.

About UAS Messtechnik GmbH

UAS Messtechnik GmbH specializes in industrial measurement and control technology. This year, the company is celebrating its 30th anniversary in the industry. Headquartered in Viechtach, Germany, UAS employs 35 staff members and produces turnkey complete solutions for all areas of the process industry. UAS is a certified Siemens Industry Solution Partner. As a Siemens partner with extensive experience in the glass industry, UAS has completed over 80 projects in the areas of float glass, container glass, TFT/LCD and glass fiber. The company specializes in programming projects conforming with Simatic PCS 7.



Sustainability up close

Optimizing the daily cycle time of the plant has enabled a reduction in energy costs for the batch house at Vetropack in Saint-Prex, Switzerland.

With a comprehensive range of glass packaging products for the food and drink industry, Vetropack Group is one of the largest and most innovative container glass manufacturers in Europe. The group's seven glassworks, with a total of 17 melting furnaces, have a production capacity of over 3,000 tons of packaging glass per day.

To supply its customers with innovative products, the group continually modernizes its production facilities. Vetropack believes that optimizing how resources and facilities are used is the only way to guarantee sustainable success.

A perfectly coordinated complete solution...

No sooner said than done: Vetropack commissioned UAS Messtechnik GmbH and Zippe Industrieanlagen GmbH to work together on the project. The two companies were tasked with designing and implementing an end-to-end, perfectly coordinated automation solution based on Simatic PCS 7. Working in tandem allowed them to play to their strengths: As general contractor, UAS was responsible for updating the existing PCS 7 concept for the melting furnace and ancillary components, and converting the firing system from heavy oil to natural gas in compliance with the latest

standards – including a new feeder controller. Zippe contributed its expertise in batch house control and integrated its automation solution throughout the entire system. Drawing on the two partners' breadth of experience and know-how, a comprehensive concept for converting and adapting all plant segments was developed and implemented in just a few months.

...for the batch house, the melting furnace and ancillary components

All these measures were designed to respond to Vetropack's demand for a future-proof plant

that is upgradeable in line with APL standards, and equipped with the latest version of the process control system, Simatic PCS 7. "This provided the basis for combining all segments in plant-wide automation. Furthermore, Vetropack is now equipped for the future with a cross-plant concept," explains Peter Höfig, Head of the Project Department at UAS, who was responsible for planning and coordinating the project.

Another priority for Vetropack was to increase the performance, availability and user-friendliness of the plant in Saint-Prex, Switzerland. The contract also covered a conversion of the firing system from heavy oil to natural gas. This was achieved through a complete solution, which included an integrated gas chromatograph from Siemens. The existing oil-firing system now serves as a back-up system.

Greater performance, capacity and user-friendliness

In order to increase performance at the plant, the batch house and melting furnace, including all ancillary components, were fitted with redundant servers, and the network structures were adjusted. This improvement met the operator's demand for greater availability. Finally, Vetropack's monitoring and operating systems were adapted to the plant structure, and optimized for user-friendliness according to the plant operator's specifications.

"Thanks to plant-wide automation and the central engineering, Vetropack can now make processes transparent, access central data, and thus react quickly to changes in the plant. The result is a more efficient plant with greater availability. This is the all-important cornerstone when it comes to sustainability – particularly as the concept can be used across plants," adds Höfig.

One of the main challenges in the project was to implement the changes during full operation, without any production downtime – the engineering equivalent of open-heart surgery. Production ran at 100 percent capacity during the project: "This was another important piece in the puzzle, and thanks to constructive cooperation and communication from all parties, we were able to fit everything together perfectly," Höfig is pleased to report. Even the gas system was integrated during ongoing operation.

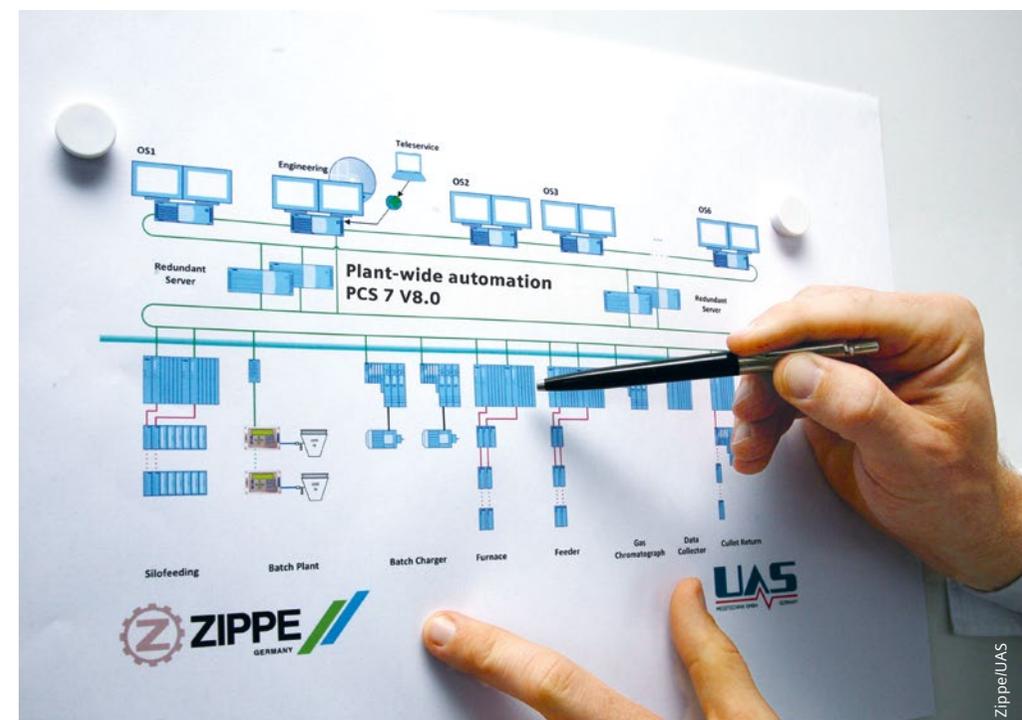
Everything in place for cross-plant operation

After only a few months, all work to update the plant was completed in April 2014 to Vetropack's full satisfaction. Even so, the operator and their project partners are already considering future moves: the automation concept was installed in the Saint-Prex plant with the aim not only of plant-wide operation, but also across Vetropack's plants.

One thing's clear

"With a focus on sustainability, we developed solutions for Vetropack that will make their operations flexible, highly energy efficient and future-proof. This gives the company a major competitive edge."

Thomas Donaubaer, Managing Partner
at UAS Messtechnik GmbH



The process control system Simatic PCS 7 forms the basis of an end-to-end automation solution incorporating all plant sections at Vetropack.

“A question of trust”

Werner Mennig, responsible for batch preparation and furnaces at Vetropack in Saint-Prex, explains why an optimized concept was essential – particularly for the batch house.

Mr. Mennig, plant-wide automation was introduced in your plant in 2008. Why is an update needed so soon?

Werner Mennig: The batch house provides a good example of why we needed an update. Before we commissioned Zippe and UAS, the software for visualization and process control was far from able to meet our needs. In our view, the batch house and furnace should not run on the one server pair. In the end, the existing programming complicated matters. Plus recipe handling – a central function in batch house control – was simply not workable. Scripts and tools also did not meet PCS 7 standards, so it was practically impossible to upgrade the system.

How was this difficulty resolved?

Mennig: Zippe developed an optimized concept for batch house control with its own process control, weighing computers, and a supporting hardware manual level as a redundant emergency control.

Were there any other glitches before this upgrade?

Mennig: Under the old server concept our problems were unfortunately not limited to the batch house, but in fact concerned the entire production process.

What made you choose Zippe for upgrading the batch area?

Mennig: It was a question of trust. Zippe had already upgraded the batch house control in our Gostomel, Nemsova and Kremsmünster plants to Simatic PCS 7 – and we were thoroughly satisfied with the results. As a Siemens Solution Partner, Zippe has what it takes to provide an automation solution that fits perfectly into a plant-wide automation concept. Moreover, only Zippe had the ability to upgrade the installed weighing computers to the latest version of a multi-component dosing computer.

How do you feel the overhaul went in the end?

Mennig: Just a single hour of downtime costs the plant several thousand euros from loss of production. So I am pleased that everything went so smoothly, and with no interruptions.

What do the operators think about the new solution?

Mennig: The new system is self-explanatory and can be operated intuitively. The operators are delighted with the user-friendliness. Communication between Zippe and the staff was perfect; all texts were in French and easy to understand, and there was always a contact person available.



Volker Scheurich (left), Software Engineer at Zippe, shows Werner Mennig from Vetropack the new options for plant operation with PCS 7.

How has the upgrade affected the batch plant in terms of cycle time and energy costs?

Mennig: Previously, the cycle time was 19 hours per day; now it is down to 14 hours at most. That is a very positive outcome. The shorter cycle time in the batch house has resulted in lower energy costs. In addition, maintenance intervals for individual aggregates have been extended, which provides further cost savings. With its integrated software modules, the new system helps us to detect any preventative maintenance required and to plan ahead. This enables us to reduce the risk of unexpected downtime in individual aggregates. Production is therefore more robust, and we expect to see an improvement in the quality of our products.

Do you have any last comments for GlassFocus readers?

Mennig: I have outlined how the upgrade helped improve operations in the batch house. However, I must also express our gratitude to Zippe and UAS as general contractor for overhauling the existing PCS 7 concept not only in the batch house, but also for the melting furnace and the ancillary components. The team also provided impressive service in converting the firing system from heavy oil to natural gas in line with the latest standards, including new feeder control.

Mr. Mennig, thank you for the interview.

“Pioneers in plant-wide automation”

How does Zippe position itself to remain a preferred supplier for its customers?
Answers from Dr. Bernd-Holger Zippe, Managing Partner of Zippe.



Dr. Zippe, what are the greatest challenges you face as a supplier to glass manufacturers?

Dr. Bernd-Holger Zippe: We have to reduce costs while maintaining the same high quality. Our customers expect the highest quality when it comes to plant equipment, installation, commissioning and service – and that is how it should be.

What changes do you anticipate in the future?

Dr. Zippe: One of the main strategic issues in the glass industry over the past 25 years has been the global growth in the flat glass and, in particular, the float glass industry. These have been important areas for Zippe’s range of solutions and services. However, we are currently noticing a decline in the number of new and planned float glass plants worldwide. In the short term at least, there will be a greater focus on renovating, modernizing and increasing the efficiency of existing float glass lines.

What does that mean for your strategic positioning?

Dr. Zippe: We will have to concentrate on other areas of the glass industry in the near future: on hollow glass, glass fiber and the special glass industry, and perhaps glass recycling.

How can Siemens help you achieve your goals?

Dr. Zippe: Siemens has been one of our preferred suppliers for decades. We have been strategic partners for many years, particularly as suppliers for the glass industry. Siemens offers precisely the technology components and innovative approaches we need to develop control and weighing solutions for our customers. The reliable customer support and quick reaction times for servicing are further invaluable advantages.

What are the top concerns for your customers in the glass industry?

Dr. Zippe: All customers wish to increase their plant efficiency and availability. We are ideally positioned to respond to this, particularly given our collaboration with partners worldwide.

Does this include plant-wide automation?

Dr. Zippe: Zippe began working with Simatic PCS 7 for batch house control as early as 1997. Plant-wide automation was still unheard of then. Zippe was a pioneer in the glass industry and as such has supported the concept right from the start. For us as a Siemens Solution Partner, the concept is a major area of our business, and our specialists enable us to meet the industry’s demands.

Which selling points help you win contracts?

Dr. Zippe: Our many years of experience is a decisive advantage. When it comes to large investments in the glass industry, no customer can afford risky decisions or anything less than the perfect solution and service. We also offer creative approaches, reliable solutions, competitive pricing and considerable technical expertise in implementation.

Does being in a position to provide plant-wide automation play a role?

Dr. Zippe: Plant-wide automation is a premium solution, and one that has been in greater demand among our customers in recent years. Customers are increasingly aware of the added value such solutions can bring, and interest is growing.

Dr. Zippe, thank you very much for the interview.

The best of both worlds

Sorg Group offers glass producers the best of both worlds for the batch house and hot end – by melding Sorg and EME’s expertise to drive innovation for the global market.



Egbert Wenninger, Managing Director of EME Maschinenfabrik, a Sorg Group company

You are positioning yourself more and more as a group. Have your customers benefited from this already?

Alexander Sorg: Customers realize that our capacity as a group is greater than the sum of our constituent companies. On the one hand, Sorg plans and manufactures a comprehensive range of melting furnaces, working ends and forehearths. EME’s specialty, on the other hand, lies in systems for batch and cullet treatment. For customer support and acquisition, we provide a single contact partner for the entire plant; we pool resources and offer all-encompassing project management.

Egbert Wenninger: We are the only providers that work as a team to develop the batch house and furnace as a single solution – all in a comprehensive process. We pay special attention to the interface, an area in which we offer our customers innovative solutions.

What is unique about your interface solutions?

Sorg: This is where our Batch3 concept comes into play. Every single percentage of energy saved makes a big difference, and that is what we focused on. We are now able to offer verified savings of over 15 percent.

Wenninger: Batch preheating is an integral part of the Batch3 concept, together with the EME-NEND batch charger and the customized IRD doghouse. This innovation is all thanks to the unique combination of batch and melting expertise that EME and Sorg offer together as a group. This gives customers a number of advantages: lower energy



Alexander Sorg, Managing Partner of Sorg Group

consumption, greater melting capacity, less dust collection in the plant, less parasitic air and an optimal batch distribution in the furnace – all while achieving better glass quality. And last but not least, we also ensure end-to-end visualization for measurement and control technology.

Have glass manufacturers recognized all of those advantages yet?

Sorg: Batch3 was launched two years ago, and we are continually enhancing the process, reducing costs, and investing in distribution to ensure commercial success. The concept requires considerable sales support, and we need to make the energy savings more apparent to the customers: it enables a 10 percent increase in melting capacity, all while reducing CO₂ emissions. In addition, this also offers stronger arguments further down the line for glass as an environmentally friendly packaging material.

Wenninger: We are on the right tracks, and our customers often tell us they chose us thanks to the winning combination of system capacity, price, service and the reliability of our group.

Do your customers mention any other wishes or concerns?

Sorg: Around 90 percent of our customers find energy efficiency a priority in their plants. This is a clear global trend. Costs are naturally a concern, and there is also a desire for innovation in product characteristics, such as the weight or stability of a container.

Wenninger: Under the Industry 4.0 strategy, there is also the demand for increasingly integrated control. Operators realize that a greater degree of automation raises process security and output. I still feel, however, that the industry has a long way to go.

How is Siemens able to help you in this regard?

Sorg: We need a core strategic partner for measurement and control technology – and that is precisely the role Siemens fills. We work together as a team to develop highly standardized solutions for plant automation with an impressive cost-benefit ratio. It is these complete solutions that distinguish Siemens from suppliers offering isolated products. After all, we don't manufacture mass-produced items, but individual solutions – and for that we need a trusted partner like Siemens to provide support when we need it. We started working with Siemens in the late 1990s, and we have never looked back.

Wenninger: As leaders in their fields, Siemens and Sorg cooperate to offer cutting-edge technology and an excellent global service network. Yet we need to work together to clearly communicate the benefits of standardization. Our standardized integrated solution for measurement and control technology is more cost effective. It can be developed and commissioned more quickly, and it is easier to service remotely than any legacy system at our corporate customers' plants.

Siemens is all ears. Is there anything else on the wish list?

Sorg: We need advice that reflects an understanding of our business. After all, we count on Siemens as a partner, and we need reliable advice – and that is what we get.

Siemens provides plant-wide automation at your customers' sites in conjunction with the compatibility you provide. What responses have you received?

Wenninger: Responses have been very mixed. New facilities on greenfield sites have enjoyed enthusiastic responses and high acceptance. There are, however, still



 Sustainability up close

Sorg Group's Batch3 concept offers 15 percent energy savings per ton of glass and a 10 percent increase in melting capacity. That's not all: further advantages include less dust collection in the plant, less parasitic air, and an optimal batch distribution in the furnace – all while achieving better glass quality.

reservations regarding reconstruction sites, as plant operators tend to make short-term cost-benefit calculations, and the concept is often difficult to integrate into existing automation environments. But in general, customers are very receptive and understand the long-term advantages of standardized hardware, operating and planning tools. We can always offer compatible solutions if that is what the customer requires.

Sorg: We operate in a very capital-intensive industry, and we are all well aware of that. Nonetheless, plants with "sustainable" as a standard setting should still be a priority.

Mr. Sorg, Mr. Wenninger, thank you for the interview.

From the managers' perspective

The editorial team of GlassFocus interviewed managers in the glass industry around the world and asked them to share their personal thoughts on the subject of sustainability.



Giacomo Sangalli (center) is proud of the award Sangalli Group received from the Italian Ministry for Economic Affairs and the Environment in 2011 for its heat recovery system using the ORC.

We are currently in the process of converting the entire plant to LED lighting, a project that will be done by 2015. As an ISO-certified business, we also expect sustainable practices from our suppliers. Plus, in the area of logistics we are making efforts to find alternatives to road freight for transporting glass.

And what expectations do you have of Siemens?

Sangalli: Energy efficiency is our top priority in all areas. We are carefully monitoring new electric motors, for example, and have been surprised at how their energy consumption has decreased in a very short time frame. In terms of energy efficiency, our other ten-year-old motors now seem very outdated in comparison. Energy costs in Italy are the highest in Europe, so we really have to work on energy consumption if we want to stay competitive in the glass industry. It is therefore hugely important to us that Siemens continues to conduct intensive research into energy-efficient solutions and products.

What other issues are currently relevant for glass producers?

Sangalli: Other than energy consumption, logistics and innovation are very important. When it comes to logistics, we are not only concerned with lowering costs, but also CO₂ emissions. As for our innovative architectural glass: we are not just interested in profit margins, but are truly committed to improving heat insulation in buildings.

Thank you very much, Mr. Sangalli.

Giacomo Sangalli,

CEO of Sangalli Group, Italy

Mr. Sangalli, how do you define sustainability at your company?

Giacomo Sangalli: For us as a glass manufacturer sustainability means, first and foremost, energy independence. This is something we have been putting a lot of work into at our Manfredonia plant since 2007, for example. We were the first-ever float glass plant to implement a system for heat recovery through the ORC

(Organic Rankine Cycle), a method similar to the water-steam phase change, but using organic substances instead of water. Our next step was to use photovoltaics and solar thermal energy.

As a result, we were awarded the Green and Public Procurement prize by the Italian Ministry for Economic Affairs and the Environment in 2011 for our complete range of activities.



Dr. Bernd-Holger Zippe,

Managing Partner at Zippe Industrieanlagen GmbH,
Germany

Dr. Zippe, sustainability can seem like an empty buzzword if it is not backed by actions. How do you lend weight to the term at Zippe?

Dr. Bernd-Holger Zippe: For us, sustainability is the opposite of short-sightedness. We aim to be a long-term partner for our customers – one that does not just develop short-term “cheap” solutions. The result is that our technological advancements have much more longevity than those of the competition – particularly compared to solutions from the Far East. The phenomenon of the throwaway society is the opposite of what we stand for.

It all starts with training staff members, who subsequently tend to stay with the company for the long term. Then we have sustainable manufacturing processes; for example, we use energy-saving production systems. Even the design of our office building is environmentally friendly. We also aim to develop products that consume as little energy as possible and help our customers to save energy in production.

How could your customers contribute to sustainability themselves?

Dr. Zippe: It would be good if customers did not choose suppliers that offer the cheapest initial prices, but instead considered the long-term lifecycle costs of the product.

And how can Siemens contribute?

Dr. Zippe: We expect high-quality products that have a long service life and offer real advantages for our customers. That means a low failure rate and long-term availability of spare parts.

How much sustainability do you think the glass industry has achieved so far?

Dr. Zippe: In my opinion, the glass industry has already made great progress in terms of sustainability. There are countless examples. Just look at how circuit water is successfully treated and used in continuous cycles at glass factories today. Similarly, a large proportion of particulates filtered out in air purification are often re-used in the melt. It has also been possible to reduce energy consumption and reject rates. In a number of areas, the glass industry is a pioneer in the sustainability movement – you only have to look at the extent to which recycled container glass is used in industrialized nations. The glass industry is far ahead of any other industry in that regard.

Thank you very much, Dr. Zippe.



Nick Shore,

Head of Engineering at NSG,
the Japanese company that bought Pilkington

be truly sustainable if all involved share consistent goals and values – that means employees, customers, suppliers, investors and many more.

You mentioned suppliers. What role do you think Siemens can play?

Shore: Siemens contributes high technology and a global network to help us implement and support projects in our global operations. Two aspects that we have found particularly helpful are Siemens' key account management and its project finance team. The key account approach has helped us to translate solutions from one country or business sector to another. Now that's what I call sustainable. Regarding finance, Siemens has been very helpful, especially since we had to focus our investment program very carefully. This allowed us to realize innovative energy saving projects that otherwise would have had to wait.

What are the biggest current challenges for you as a glass producer?

Shore: In the short term, we need to become more competitive in the face of ever-rising input prices. The glass industry has had a very difficult few years due to the massive reductions in capacity around the world. We need to return to good levels of profitability that will give investors the confidence to invest in growth for the future. Siemens can support us by working with us on designs and specifications to reduce the initial capital costs, and by helping us save energy to reduce operating and maintenance costs, thus improving the lifecycle impact of our products.

And in the long term?

Shore: In the longer term I believe the glass industry has to decarbonize to a large degree. The only practical way to do so seems to be electricity. We will need to develop novel melting and forming technologies, which will mean a radical rethink of glass melting furnaces. I believe Siemens is in a position to help us tackle the technical challenges we will no doubt face.

What will the central issues be in the glass industry in the coming years?

Shore: As an industry we need to demonstrate that we are part of the solution, not the problem. We need to become ever more efficient in our energy usage, while improving our product performance to give better lifecycle costs and environmental benefits. We need to get better at letting people know how beneficial glass is; for instance, overall emissions of CO₂ in the EU would reduce by 100 million tons per year by if all glazing was simply upgraded to meet current standards. We need to persuade legislators to look at the lifecycle benefits and encourage the use of energy-efficient glass, instead of just punishing high energy users without looking at the bigger picture.

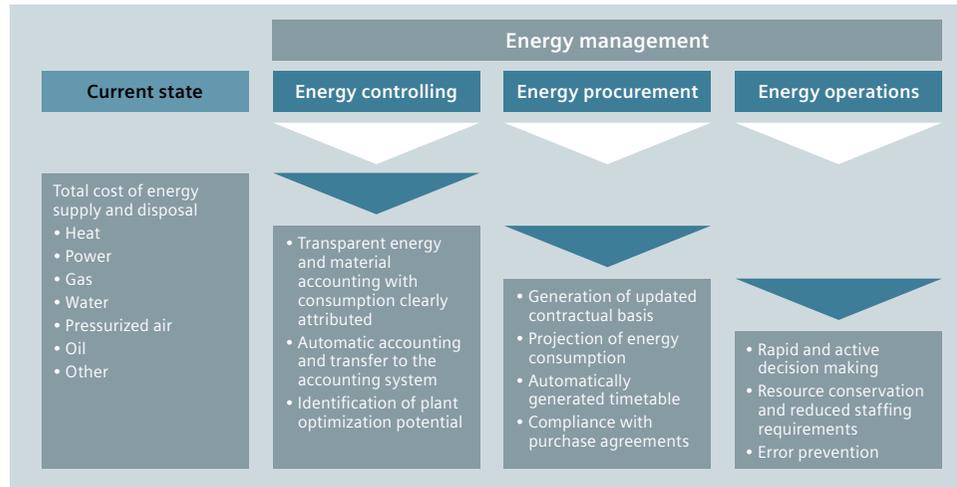
Thank you very much, Mr. Shore.

Mr. Shore, at NSG, sustainability is part of the company strategy with fixed targets for a five-year period. What does that mean in practice?

Nick Shore: Let me give you a few concrete examples. It's no secret that we use a great deal of energy to make glass. But the energy we consume can be paid back in less than six months if the glass is used to upgrade a single-glazed window to a double-glazed one that meets current regulations. In the lifetime of a window the energy is paid back in energy savings many times over. NSG's main focus is on added value, so we need to maximize our customers' benefits while reducing our costs, and that is why our products and processes are geared toward energy efficiency and waste reduction. However, this can only

Focus on sustainability

B.Data helps glass manufacturers reduce energy costs through improved controlling and more efficient processes in procurement and operations.



B.Data at Saint-Gobain

The French industrial group Saint-Gobain has set itself ambitious sustainability targets. To achieve them, the renowned glass manufacturers Saint-Gobain Glass Deutschland GmbH and Saint-Gobain Oberland AG have adopted Siemens' energy management system B.Data. The works now use B.Data for a transparent assessment of energy consumption in their glass manufacturing processes. The system offers precise analysis and reliable forecasting for future energy requirements.

Keeping an eye on energy

The software solution Simatic B.Data provides transparency for company-wide energy consumption and costs. The aim is to optimize production efficiency.



Manufacturing glass is an energy-intensive process. As a result, energy accounts for a large proportion of overall production costs. Ways of saving energy are therefore of great interest to glass producers, especially in countries like Germany where under certain conditions energy management is publicly subsidized. Siemens' Simatic platform offers a range of scalable energy-management solutions, including the comprehensive system Simatic B.Data. With the help of B.Data, operators can make entire plants, sites and businesses more energy efficient. The software makes energy consumption and costs more transparent by providing detailed data and key figures for all media, such as electricity, gas and water. It is even possible to display the

impact of environmental variables such as temperature and humidity. In addition to energy monitoring, the tool also offers an energy controlling function: Drawing on specific key figures, B.Data uses pure consumption data to calculate valuable efficiency indicators. The manufacturer can then use these indicators to compare individual plant segments or sites, for example, or to define benchmarks.

Optimizing energy procurement

B.Data users can forecast their plants' future energy requirements. Based on these requirements, they can select the ideal tariffs and purchase their energy at the best prices. B.Data also supports glass producers in their

day-to-day operations with a number of useful functions. For example, the software makes it easy to produce reports – such as for internal audits or environmental authorities – and export them in Microsoft Excel charts. B.Data even enables companies to trace and assess measures for increasing energy efficiency in line with ISO 50001. Adherence to this standard is a requirement for a number of national incentive programs. Further benefits include meter management and automatic consumption readings via a range of interfaces. All this makes B.Data an invaluable tool for optimizing energy usage throughout a plant, or even across a company.

The systematic way to save

Optimizing energy consumption – for both environmental protection and cost reductions – requires system solutions that are perfectly in tune.

Improving the energy efficiency of a business takes more than improvements here and upgrades there – it requires a systematic commitment to the issue of energy efficiency. The challenge for suppliers, mechanical engineers and glass manufacturers alike is to cooperate to increase efficiency across the entire process. To optimize energy savings, automation systems and production processes must be perfectly coordinated.

The first pillar of reducing energy consumption is energy-optimized individual components such as switchgears, protection devices, monitoring systems, soft starters, frequency converters, motors and an array of other systems. This can be achieved in a selective, immediate approach. The second pillar is energy management, which offers considerable opportunities to achieve further savings.

Data network plays a key role

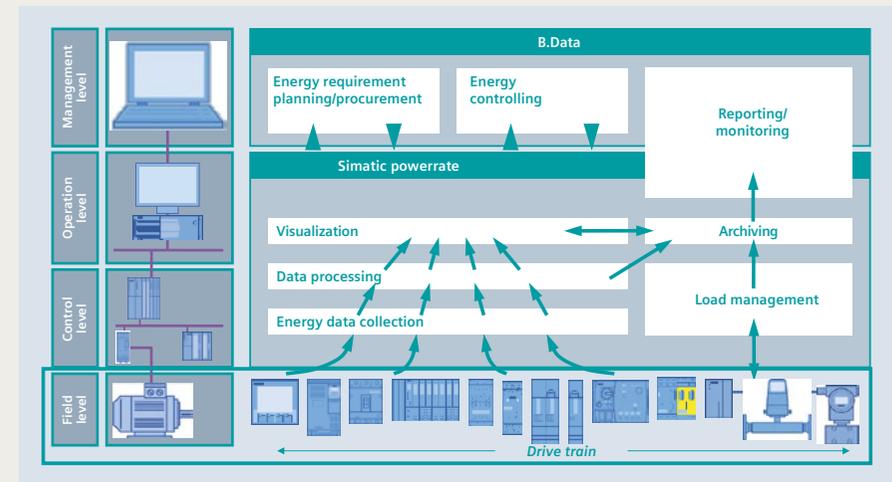
An energy data management system (EDMS) enables glass manufacturers to keep a very close eye on the energy forms used in glass-works: electricity, gas, steam, air pressure, heating and cooling. The EDMS receives the current measurement readings from the automation and control level, and can thereby ensure optimum resource usage.

However, a complex energy management system requires energy data to be gathered and processed for all individual units in a transparent way. This can be achieved with the help of multifunctional measuring equipment, control devices and the latest switchgears. Drive technology, for example, is now available with integrated data recording systems.

End-to-end engineering

In addition to energy-optimized individual components and automated energy data management systems, a third pillar is the efficient use of resources: optimum engineering. When selecting devices and systems, the overall cost of the final solution must be considered. The total cost of ownership (TCO) includes all costs in terms of investment, usage, consumption, maintenance and repairs across the entire life-cycle of a system.

Thus, both the overall solution and the right components have a decisive role to play. Siemens offers all the right products for optimizing energy efficiency: from measurement and sensor devices, switching, drive and control technology, all the way to energy management. And of course, end-to-end communication between all systems involved (see graphic) is essential.



Energy data management systems such as Simatic B.Data from Siemens receive current measurement readings from the automation and control level to ensure optimum resource usage.



Highly efficient and up-to-date devices offering integrated measurement functions and effective communications are essential for developing an overall energy-efficient solution.

Focus on sustainability



Sklostroj's portfolio includes machines for producing glass containers of all sizes.

Trendsetter in container glass machinery

For over 60 years, Sklostroj Turnov CZ, s.r.o. has specialized in developing and constructing machines used in glass plants across the globe for producing container glass. Sklostroj is renowned for its custom-made solutions for the hot and cold ends of the glass production line. The Czech company, which counts some 350 employees, has sites in Turnov and Znojmo.

Greater efficiency equals improved availability

Thanks to Siemens' Integrated Drive System concept, the Czech glass machinery manufacturer Sklostroj is improving its competitive position.

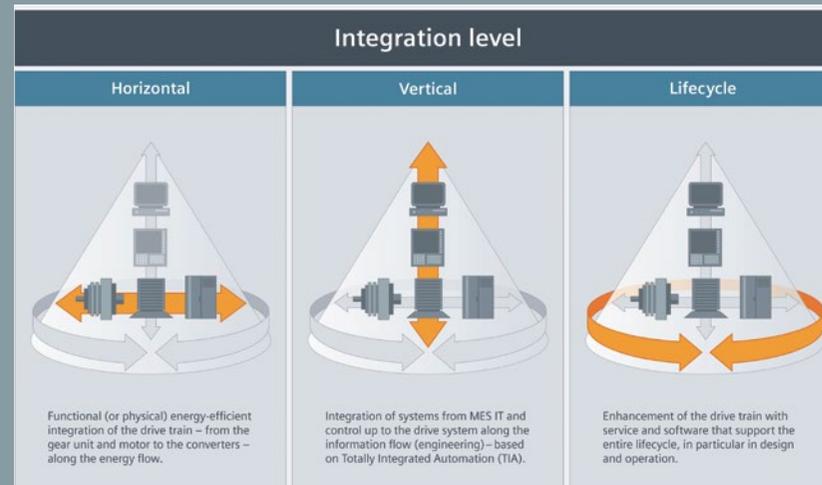
In the glass industry, there is an increasing tendency to replace mechanically coupled motions and application-specific control systems with standardized mechatronic solutions. One of the companies leading the way is Sklostroj Turnov. The Czech manufacturer produces IS (Individual Section) machines for the container glass industry. The core component in these machines was traditionally a mechanical cam follower. This determined when the various hydraulic and pneumatic drives were activated. However, in its current machines, Sklostroj has replaced the previous pneumatic solution with servo drives and controls from Siemens – making it one of the first companies

to tap the efficiency potential offered by the new Siemens concept, the Integrated Drive System (IDS). The result is a drive train that is fully optimized – from the converters to the coupling – with all interfaces covered in the automation. This ensures plant availability and productivity. As early as in the engineering phase, various configurations for use in production can be simulated and optimized.

The latest container glass machine

The new machines can be fitted with between 9 and 17 servo axes per section to suit the customers' needs and the type of cooling used. They can also complete up to 25 cycles per

minute per section, depending on the product. This makes them the most cutting-edge container glass machines with the greatest number of servo axes on the market. The IDS concept even scores highly in terms of sustainability: "With the new threefold integration of the drive system and motion control system, our machines now offer energy savings of approximately 40 percent, and have a 15 percent higher availability. Then there is the added advantage of data consistency, which really pays off in construction, commissioning and production," says Rolf Themann, Executive and Technical Director at Sklostroj.

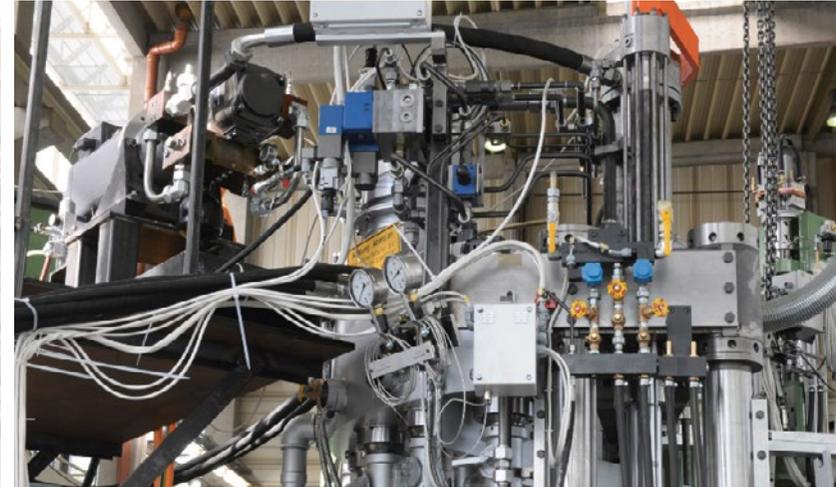


The Integrated Drive System features threefold integration: horizontal, vertical and along the lifecycle.

One thing's clear

“The motor and servo pump only operate when the ram is actuated, which gives us energy savings of up to 50 percent.”

Rainer Wagner, Head of Engineering and Procurement at Waltec



The unit comprising a servomotor and oil pump system (top left of image) is compact and therefore easy to integrate into glass presses.

Servo pump for hydraulic glass pressing

Up to 50 percent energy savings, a more compact design, greater flexibility and increased output – these are just some of the advantages of Waltec's latest servo glass presses.

The concept for the new model was to replace the conventional hydraulic design with a servo pump system. Pressure and volume flow in the hydraulic system are no longer controlled by valves, but through the torque and speed of a servomotor. In this system, energy is only supplied when it is actually needed in the hydraulic cylinder, which increases energy efficiency considerably. A comparatively small pressure accumulator replaces the oil tank in the conventional hydraulic system. This compact solution can therefore be positioned directly on the machine. Further advantages are the minimal pipe lengths and oil volumes, which keep pulsation to a low level and ensure optimum

stability and control. The automation technology in almost every Waltec machine today comes from Siemens – as has been the case for decades. The new servo-hydraulic presses are no different: the latest models are controlled by a Simatic S7-300 and are operated and monitored via a Simatic HMI device.

Easy retrofitting

New features include the modular inverter system Sinamics S120 and the Simotics servomotor for driving the pumps. So as not to interfere with the tried-and-tested process control system and to have an autonomous control cabinet unit, the pressing process is

controlled in the inverter system's control unit. This is the ideal basis for retrofitting glass presses from Waltec as well as those from other manufacturers.

Waltec glass presses featuring the energy-saving servo pump system have been used since 2012 in major manufacturing plants across the globe. The machines have proven to be highly functional, suitably designed, and efficient in demanding environments under continuous operation. While the concept was initially only fitted in single-piston machines, it is now also used as an efficient solution for machines with two or three pistons.

Expertise in the glass industry

Waltec Maschinen GmbH, based in Wilhelmsthal in central Germany, is one of the world's leading manufacturers of automatic, electronically controlled machines for feeding, pressing, pressing-and-blowing, spinning, laser cutting and polishing in the glass industry. The company's portfolio also includes handling and transport systems. Founded in 1889, today Waltec offers all the above from a single source, and also supplies turnkey solutions for glass production.

Planning





NX is a complete solution for digital product development. The NX portfolio is part of Siemens' software offering for product lifecycle management.

Total transparency

Product lifecycle management (PLM) allows products to be successfully developed, produced and brought to market.

Wouldn't it be great to create the best product possible based on well-founded, accurate decisions? Siemens PLM Software with its product lifecycle management solution provides the level of transparency it takes. The software portfolio covers everything, from the formulation of a concept to the end of a product's lifecycle, thus enabling companies to build the right product – and to build the product right. PLM is the mission-critical system for continuous product and process innovation.

A wide range of applications

NX, the product development solution from Siemens PLM Software, delivers the advanced performance and leading-edge technologies to master complexity and compete globally. Digital lifecycle management, featuring the Teamcenter solution suite, enables globally dispersed enterprises to engage every facet of their business for the introduction of new products.



Control cabinet documentation entails a considerable workload. Relevant expertise makes light work of it.

Safety first

Control cabinet engineering is subject to a wide array of guidelines. With the help of Siemens, complete, up-to-date and standard-compliant documentation is not as tricky as it sounds.

A control cabinet may be supplied as an electrical product ready for connection, meaning it is subject to the Low Voltage Directive; or it may be considered a safety component in accordance with the Machinery Directive. These underlying issues should be cleared up in advance between the control cabinet manufacturer and their customer, the machinery and plant operator. After all, the particular guidelines a control cabinet is subject to have a major influence on the conformity assessment procedure, on CE marking in the EU, and on the manufacturer's obligation to provide verification, such as technical documentation or internal test reports.

If the machine is exported, the documentation must take the applicable local guidelines into consideration. For suppliers, this means an enormous additional workload. To lighten that load, an international team of experts from Siemens advises and supports machine manufacturers, ensuring there are no nasty surprises on site at the time of commissioning. The consultants from Siemens also advise on planning tools such as CAx Download Manager, or the online tool My Documentation Manager. All this allows users to meet growing requirements in terms of documentation – without all the extra work.

A long-term partnership

Karl-Heinz Bertram, CEO of Bertram Elektrotechnik GmbH, champions tailored special-purpose solutions for customers in the container glass industry.

Mr. Bertram, what solutions does your company offer the glass industry?

Karl-Heinz Bertram: On the one hand, our machines specialize in aligning bottles and glass containers with precision. Using a camera-controlled, fully automated orientator, we are able to turn up to 500 containers per minute to precisely the desired position on its rotational axis. On the other hand, our machines for the cold end also sort bottles and glass containers according to shape, color, size, emblem or embossing, that is, the raised markings on many designs. They can also separate containers, extracting them from the ongoing product flow without causing backlog.

Which selling points help you win contracts from manufacturers of hollow glass?

Bertram: Our expertise in container glass manufacturing is a decisive advantage. So too are a range of functions our machines offer. The fact that we supply customized, special-purpose solutions also plays an important role. There are few competitors, if any, who are able to do the same. And naturally, customers are also concerned with costs.

Price erosion has become an increasing problem in recent years.

Bertram: Yes, and we have also been affected. There is particular competition from southern Europe. We need

to offer cost-efficient machines in order to maintain a strong foothold in the market.

What other issues are currently a priority for your customers?

Bertram: Plant availability and energy savings. In the container glass industry, plants run 24 hours a day, 365 days a year. Energy efficiency is therefore an extremely important factor. We aim to respond to this challenge by designing energy-efficient systems, particularly in the area of drive technology for conveying machinery. New, innovative processes are needed to reduce the industry's enormous energy consumption.

What are the main challenges for you at the moment as a supplier to hollow glass manufacturers?

Bertram: We have to meet ever-greater demands in terms of safety. The glass industry is also producing an expanding range of products. The result: customers expect more and more from electric and mechanical automation systems – as well as greater production capacity. Our challenge is to meet these demands, while also ensuring the consistent quality and availability of our products.

What does sustainability mean for you in practice?

Bertram: It is important for us to be able to work together with reliable partners in the long term.



Karl-Heinz Bertram,
CEO of Bertram
Elektrotechnik GmbH

What do you expect from a partner like Siemens in terms of sustainability?

Bertram: Our products such as the Orientator, Separator, Allocator and the intelligent Line Control are developed and based on Siemens products – so long-term availability of components is important to us. Having Siemens by our side puts us in a position to develop optimized solutions for the industry, in particular for automation in the cold end.

Siemens is dedicated to the concept of plant-wide automation. What responses have you had from glass manufacturers on the subject?

Bertram: Our products are required to provide data that feeds into the overall plant automation. The conformity of the products installed is a particular advantage for spare-part stock-keeping and reduces operating costs.

Mr. Bertram, thank you very much for the interview.



The Separator divides different types of bottles and glass containers into as many as four streams, all while maintaining consistent production speed.

The Orientator is designed to precisely adjust containers to the best position for the following production stage.



About Bertram Elektrotechnik GmbH

Bertram Elektrotechnik has been active in the glass industry since 1974 and specializes in machines for orientating, sorting and separating bottles and glass containers, particularly in the cold end of the production process.

Bertram offers its customers individual solutions for automation, image processing and SPS programming. The company's services include analysis, project planning, production, assembly and commissioning – all from a single source. In developing and implementing its technology, the Solution Partner takes advantage of Siemens' broad portfolio.





Intelligent planning

BertschEnergy plans its waste heat recovery boilers using Comos, Siemens' end-to-end software solution with a central database for planning and operation.

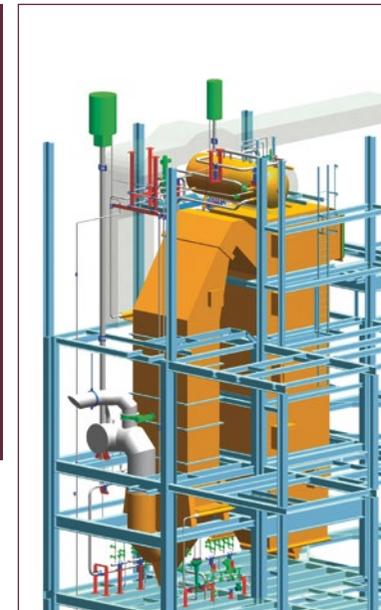
The integration of product and production planning will play an ever-greater role in the manufacturing processes of the future. Innovative automation concepts such as cyber-physical systems or autonomous manufacturing require the networking of production equipment along the entire value creation chain. One of the main

advantages of such concepts is that they enable a flexible production process. Intelligent software solutions such as Comos from Siemens are able to display the engineering processes exactly, even in the early stages of plant planning. This makes it possible to detect inconsistencies before it is too late and to ensure smooth plant operation.

About BertschEnergy

BertschEnergy, part of the Austrian Bertsch Group, has planned and supplied waste heat recovery boilers for the glass industry for over 30 years. The medium-sized family business specializes in the water-steam cycle and pioneers concepts for heat recovery and in-plant power generation. For its heat recovery plants, BertschEnergy uses electrical equipment, automation technology and steam turbines from Siemens. The plants are based on a modular concept and are planned, assembled and installed individually for customers.

A heat recovery plant is a wise investment: over 90 percent of energy that is otherwise wasted is fed back into the glass production process.



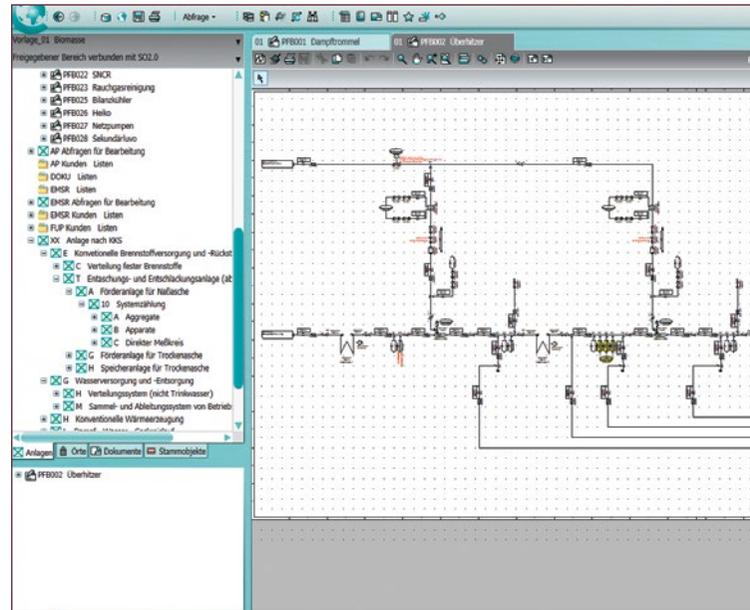
From concept to commissioning, BertschEnergy uses digital planning tools.

Comos at a glance

Siemens' software solution Comos is based on a uniform, object-oriented data platform and therefore offers a complete, consistent and navigable database for displaying a production plant. The customer gets an end-to-end digital model of their plant's current status throughout the entire lifecycle.

Advantages:

- ▶ More efficient engineering
- ▶ Data consistency in planning and operation
- ▶ Constant access to current documentation (as-is, not as-built)
- ▶ Considerable cost savings in planning and operation
- ▶ Shorter planning phase (time to market)
- ▶ Reproducibility for new plants



Comos offers end-to-end planning in a single planning tool, and provides a uniform display of plant segments and components.

One thing's clear

“What I appreciate about Siemens as a partner, other than the global network and top-quality products, is the open and pragmatic approach, with clear customer orientation – from the early planning phase all the way to implementation.”

Jürgen Morawa, Product Manager
at BertschEnergy

End-to-end planning with Comos

The heat technology specialist BertschEnergy makes use of the latest planning tools such as 3D planning and networked systems in the early planning stage. “This gives us an integrated approach and enables very close cooperation with our customers, offering a significant improvement on the usual individual documentation,” emphasizes Jürgen Morawa, Project Manager for waste heat recovery boilers. “The top priority for our customers is the availability and profitability of their production plants. A heat recovery plant can ensure both. The waste heat enables the operators to produce their own electricity on site, generate hot water, heat buildings, provide cooling, or use steam in downstream production stages,” explains Morawa. When planning its heat recovery plants, BertschEnergy uses Siemens' Comos solution. “Comos offers us

end-to-end planning, all in one single planning tool, and displays plant segments and components consistently,” says Morawa. “Thanks to master copies, we can plan new plants faster. The version management tool gives us a clear overview, and data transfer with subcontractors and customers is extremely easy with the import-export function.”

With all plant information saved in a central object-oriented database, all specialist teams involved in the project can access the same object data at all times throughout the planning and operating phases. “Our customers benefit directly from Comos through a higher quality of planning documentation, which we are able to provide in common formats such as Microsoft Excel or PDF. A further major, practical advantage is the consistent naming system for all plant segments: from

planning, programming and visualization, all the way to plant signage,” Morawa adds.

PCS 7 interface

BertschEnergy plans and designs its heat recovery plants as standard based on the process control system Simatic PCS 7 from Siemens. Morawa finds that “combining the plants with PCS 7 was an ideal solution that connects the production area with the plant segments for electricity and heat use via the central measuring station.” For this purpose, Siemens created an interface between Comos and the process control system Simatic PCS 7, so that the plant operator can keep an eye on the entire heat recovery plant at all times with a digital reading of the current status.



Sustainability up close

According to Jürgen Morawa, Product Manager at BertschEnergy, sustainability means continually improving processes. He believes that subprocesses must be incorporated into the main thread during the planning phase in order to avoid isolated solutions.

Production

One thing's clear

"We wanted a solution that was reliable and user-friendly. That is precisely what we got with the Sitrans LR560. The device works so smoothly – you can just install it and forget about it."

Peter Weber, Head of the Electronics Workshop at Noelle + von Campe



The LR560 radar level measuring device is installed in the day silo, which ensures a continuous supply of batch material for the melting furnace.

Reliable level readings

Thanks to the Sitrans LR560 radar level transmitter, Noelle + von Campe is able to accurately measure batch levels in its day silo.

Raw materials such as silica, soda and lime, as well as a significant proportion of recycling glass, are processed at Noelle + von Campe to produce packaging glass in a wide variety of shapes and sizes. To ensure a continuous melting process, it is essential that the day silo is able to feed the melting furnace at all times with a sufficient supply of batch material. This requires accurate monitoring of the silo. Since fall 2011, Noelle + von Campe has used the most effective sensor system available: the Sitrans LR560 radar level measuring device from Siemens. Prior to this, the company's sensors were only able to detect when the silo was at the maximum and minimum fill levels. It was therefore not possible to gather continuous level measurements. To detect how long batch supplies in the silo would last, for example when planning maintenance work, staff

members would have to check the fill level directly. This was often an arduous and unpleasant task because of the difficulty in accessing the silo and the high temperatures in the furnace area.

Greater planning reliability

The Sitrans LR560 now means manual level monitoring is a thing of the past at Noelle + von Campe. This not only saves time and operating costs, but also ensures greater planning reliability for work on the plant, while reducing the risk of production downtime. With a high frequency of 78 GHz and a very narrow beam of 4 degrees, the level transmitter from Siemens is the ideal device for gathering precise measurements of raw materials with problematic reflective properties – such as those in the day silo.

Internal antenna

Installing and activating the device was straightforward and took no time at all. The new measuring solution includes an innovative lens antenna installed in the housing, so no external antenna system is required. This feature and the device's very narrow beam mean that interference from nozzles or installations is reduced to a minimum. The internal antenna is well protected against product buildup and therefore no servicing is required. What is more, every Sitrans LR560 level measuring instrument comes fitted with an air purge connection to cool the device. And because Noelle + von Campe has also incorporated the sensor system into the WinCC operating level via Simatic, the current fill level can be called up and displayed on the screen at any time.



A long tradition

Founded in 1866, Noelle + von Campe Glashütte GmbH, Boffzen, Germany, has a long history in the glass production industry. True to its motto, "Tradition, Zeitgeist and functionality," the company produces modern, high-quality glass packaging. The product range includes over 450 items in an array of shapes able to hold between 50 and 5,000 ml – from conventional packaging glass, hexagonal jars and wire-bail jars to creative special glass models.

About Horn Glass Industries AG

Horn Glass designs and manufactures leading glass-melting technology at its plant in Plöbberg, Germany. High-capacity glass melting furnaces are supplied to glass manufacturers around the world and are used in the production of beverage bottles, food containers, drinking glasses, glass plates, glass tubes, glass fiber and special glass types. With a company history spanning over 125 years, Horn Glass developed from a small supplier to a major systems solution partner, offering everything from individual units up to turnkey furnaces from a single source. Horn Glass's complete range includes plant components such as oil or gas heating equipment, electric controls and customer-oriented services.

Satisfaction in every regard

Horn Glass was responsible as general contractor for planning, manufacturing and commissioning an entire new float glass production line at Caspian Flat Glass in Dagestan. Siemens' solutions were put to use for the process control system, network technology and power distribution.

When it came to choosing a technology partner for a new float glass line, what sealed the deal for Caspian Flat Glass (CFG) in the Russian Republic of Dagestan was Horn Glass's complete solutions. The full-service supplier based in Plöbberg, Germany – around 150 kilometers northeast of Nuremberg – not only came up with the most economical offer, but also stood out as a competent system supplier for all technology along the production line. It was precisely this expertise that enabled Horn Glass to provide a one-stop solution manufactured to the highest technical standards and tailored precisely to CFG's needs. To top it off, Horn Glass has extensive experience in Eastern Europe.

Complete solution for all technology along the line

Over a period of two years, Horn Glass provided a seemingly endless list of services: from project management, followed by engineering, manufacturing and installing the production line technology, all the way to on-site coordination. In late 2013, the plant was commissioned with a production capacity of 600 tons of float glass per day. Horn Glass also took on responsibility for training staff members at the plant and even assisted in the early stages of production. Equally impressive is the range of individual solutions that goes into installing a complete float glass production line: as any glass specialist knows, this does not just mean the melting furnace and tin bath, but includes the firing system, measurement and control technology, and the energy and media supply systems.



A glimpse into the plant (from left to right): float glass furnace, tin bath and annealing lehr at CFG in Dagestan, installed by Horn Glass, which took on all production line technology as general contractor.

A dream team

Since 1999, Horn Glass has counted on partners like Siemens. As a team the two companies are best able to demonstrate their individual strengths, particularly in large, international projects. "We value Siemens' global presence, range of products and international renown," says Markus Frank, Project Leader for Electrical Engineering at Horn Glass. "Our trusting partnership is built on years of working together on switchgears, automation technology, process instrumentation, and visualization and process control technology. When it comes to these systems, Siemens is our number one choice as a primary supplier and technology partner," the project leader adds. This was once again the case during the CFG project in Dagestan, when Siemens supplied its partner Horn Glass with systems for automation and power distribution.

CFG benefits from Siemens' end-to-end product catalogues

The range of services provided by Siemens included planning and supplying the medium-voltage switchgears and low-voltage distribution equipment with the corresponding transformers. The drive units were also fitted with Sinamics speed control systems, and a Simatic PCS 7 Process Control System was installed along with field instruments. In addition, the auxiliary facilities were automated with Simatic S7 and PCS 7 systems, and fitted with Siemens technology. All this means that the plant largely uses products and solutions from Siemens, which are not only at the cutting edge of technology but also offer CFG the many advantages of an end-to-end solution. "CFG has said they are extremely satisfied with the technology. The operator was impressed with the plant right from the start, which is seamlessly producing the desired quantity of float glass with the desired quality," Markus Frank reports.



End-to-end optimization for melting furnaces

Maximilian Sollfrank, CEO of Horn Glass Industries AG, on the company's ECO refurbishing program as an answer to the growing demand for energy efficiency.

Mr. Sollfrank, what do you enjoy most about working in the glass industry?

Maximilian Sollfrank: It is a small, friendly, straightforward industry, yet it is also high tech – and that appeals to me greatly.

And what appeals to your customers?

Sollfrank: Glass manufacturers expect fair pricing and technology they can trust. We can offer both. They also expect greater energy efficiency and flexibility.

What can you offer in terms of energy efficiency?

Sollfrank: Our ECO refurbishing program. This is a scheme developed by the company to optimize melting furnaces in terms of energy consumption, emissions levels, glass quality, performance and flexibility.

How can Siemens assist you?

Sollfrank: We rely on efficient systems from Siemens. We appreciate Siemens' high-quality products, on-site global service, and the competent and flexible support we receive on complex contracts. That's why our two companies have worked together for over 15 years.

Thank you very much, Mr. Sollfrank.

A burning passion for glass

Reliability, innovative solutions and a deep understanding of the melting process make Siemens and STG the ideal team.



All photos: STG

STG Combustion Control GmbH & Co KG – STG for short – is headquartered in Cottbus, south of Berlin. With some 50 employees, the certified Siemens Solution and Industry Partner produces automation solutions for glass melt-

ing plants around the world. Since 1995, the company has provided automation for 53 customers in the float glass industry, and for 40 customers in the container glass, crystal glass and glass fiber industries. STG is increasingly called upon to combine sophisticated automation with solution packages for energy savings, increased performance and nitric oxide (NO_x) reduction. The company provides low-turbulence gas and oil injectors, zirconium oxide sensors and lambda control, compensation for variable gas quality, and video image analysis for furnace cameras. Customers confirm efficiency improvements of between 2 and 12 percent.

Automation with Simatic PCS 7: consistency and safety

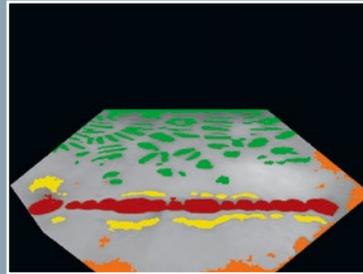
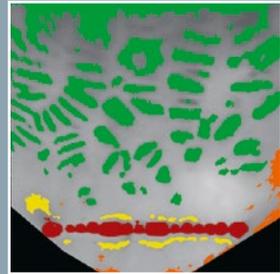
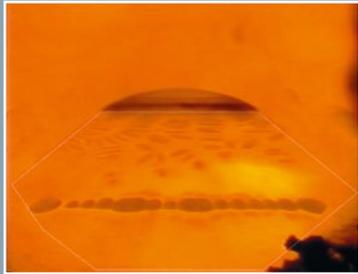
As a Siemens partner, STG has aligned its expansion over the years with the process control system PCS 7, making it a company focus. For STG, plant safety is always an important issue – and this is clearly reflected in its latest systems for the float glass industry. STG has provided both robust safety solutions with back-up controllers, and increasingly redundant and high-availability automation systems. A third option is the decentralized redundancy solution STG installed in a float glass plant, which has been operating successfully for five years. The company thus has an established catalogue of solutions for the process control system Simatic PCS 7.

If the customer requires, STG also offers automation from end to end: from the melting furnace, float bath and Lehr, all the way to batch production, top rollers, drives and auxiliary systems. To do so, STG has continuously expanded its expertise with the goal of offering plant-wide automation.

Aside from innovative solutions, customers also rely on STG's traditional know-how: STG is a one-stop solution provider for planning, cabinet engineering, programming, testing and commissioning. STG even has accommodations for the customers' engineers so they can be involved in the test phase, and later test processes on their own plants. Commissioning is completed by the same staff members who were responsible for programming.

STG Lambda Control: measuring and controlling for optimized firing

There is a very good reason why flue gas oxygen sensors are becoming a standard fixture for automatic regulation: all excess oxygen wastes energy, reduces efficiency and increases NO_x emissions. What's more, a lack of air in the firing process can produce carbon monoxide (CO), which can damage the refractory material and diminish glass quality. STG specially developed zirconium oxide sensors and combined them with the functions offered by the process control system Simatic PCS 7. The result is a patented method for detecting



Online analysis of batch coverage (OMC) in video imaging from the melting furnace.

residual oxygen, CO buildup resulting from a lack of air, and incorrect burner settings – all from the same sensor signal. STG's Lambda Control in the process control system makes it possible to maintain an excess air factor of $\lambda = 1.03 \dots 1.05$.

The intelligent Lambda Controller must determine whether uncontrolled air is entering into the furnace or the regenerator – and then adapt its control strategy accordingly. Unlike other methods of predictive control, STG's solution models developments in the disturbance value, and not the control response.

High-efficiency injectors

STG developed its FreeJet gas injectors for use in gas-heated melting furnaces. Low-turbulence gas flow and a design that eliminates injection air even in an open nozzle brick contribute to a significant reduction in NO_x emissions and energy consumption. A float glass melting furnace using the system has reported $1,100 \text{ mg/Nm}^3 \text{ NO}_x$, with gas savings of 6 percent.

These injectors and STG's software solutions for reversal and energy control in melting fur-

nace heating not only ensure a quick change-over to a backup fuel, but also allow the dual application of fuel gas and oil. The result is a gas flame with the emissivity of an oil flame.

Since 2008, STG has gradually contributed its experience and know-how in the burner industry in a joint venture with Glass Service Vsetin. Starting in 2014, the new company FlammaTec Germany GmbH has been handling STG's burner operations, a step that best combines the expertise of the two companies.

Temperature and symmetry control, and OMC video image analysis

According to STG's experience, operators typically react too slowly and too heavy-handedly when it comes to temperature control in the melting furnace. A standard PID controller is even more likely to fail. The feedback from regenerator temperatures inevitably leads to a constant increase in the difference between left and right firing. The reason for this instability is an inappropriate control concept.

In 2010, STG patented a solution for this: combined temperature and symmetry control in the melting furnace, now featuring automatic

and predictive compensation for fluctuations in heating values. This method is currently operating successfully in around 20 melting plants in Europe and Asia.

STG's Optical Melting Control (OMC) is designed to address a further problem. Images from the furnace camera are used to determine batch coverage as an indicator of energy reaching the melt. If the temperature of the furnace crown rises, the temperature controller must be able to detect whether it is because of excess energy or due to a heat transfer jam to the glass and batch (for example due to foam on the glass). Each case requires a different response.

Customers do not measure the value of new technology in terms of how pioneering it is; instead, they are concerned with how effective it is. As STG knows from experience, stability is an essential criterion in this regard. High stability can be achieved with little excess air and low temperatures; less energy is required and less NO_x is produced. In the end, the same melting furnace can achieve a higher output of glass melt.



One thing's clear

“What matters more to us than growth is to become better and more flexible in a changing world. If, like us, you can rely on a partner like Siemens and their excellent technology, then you're in a strong position.”

Dr. Peter Hemmann,
President of
STG Combustion Control
GmbH & Co KG

About AGC Glass Europe

Based in Louvain-la-Neuve, Belgium, AGC Glass Europe produces, processes and distributes flat glass for the construction, automotive and solar industries. As the European branch of AGC Glass, one of the world's largest producers of flat glass, AGC Glass Europe employs some 14,000 staff members at nearly 100 locations across Europe.

Perfectly in line

In cooperation with its strategic partner Interpane E & B, AGC Glass Europe has commissioned a new plant in Klin, Russia, for coating energy-efficient flat glass.



One thing's clear

“For me, sustainability means long-term efficiency in terms of equipment, hardware and staff.”

Eric Martin,
Project Manager at AGC Glass Europe

AGC coated glass plates are used in projects across the globe, such as in Frankfurt's MyZeil shopping and leisure center.

The balance between aesthetics and energy efficiency is an increasingly important dimension in modern architecture. As the only specialist in the market offering a complete range of energy-saving, triple silver-coated glass products, flat glass manufacturer AGC is keenly aware of this. At AGC's industrial complex in Klin, Russia, AGC Glass Europe and Interpane Entwicklungs- und Beratungsgesellschaft mbH (Interpane E & B), the R&D and Engineering center of Interpane, commissioned a new coating plant in 2013, which will use magnetron sputtering technology. The glass plant now supplies high-caliber materials to customers in the construction industry with a commitment to sustainable building practices.

Getting it right the first time

“Establishing this new plant was the first collaborative project between Interpane E & B and AGC Glass Europe,” explains Eric Martin from AGC Glass Europe, which is headquartered in

Louvain-la-Neuve, Belgium. “What mattered to us was that the new installation would have standardized hardware and would be able to fall back on a global support network.” For Martin, this clearly meant having Siemens as a partner. This was the first time Interpane E & B, AGC Glass Europe and Siemens had worked together to convert a plant to Siemens components. A feat of this magnitude called for a systems integrator with vast experience in Siemens solutions. The ideal candidate was found in on/off group. “The Process Control System Simatic PCS 7 forms the nerve center of our process automation, yet we were completely unfamiliar with it – as was our trusted OEM partner, Interpane,” recalls Martin.

Smooth teamwork requires integration

Once the systems integrator had installed the Simatic PCS 7, Siemens was also able to contribute a wide array of invaluable products and solutions to the project. Firstly, Siemens

Support from systems integrator on/off

- ▶ Compilation of an operation manual and technical specifications
- ▶ Computer hardware, PCS 7 software, network and 8 control units
- ▶ PCS 7 software development for 4,300 test points
- ▶ Development of PCS 7 special components
- ▶ Drive technology integration
- ▶ Batch tracking and archiving
- ▶ Cathode tracking with PCS 7 UserArchiv
- ▶ Commissioning and site acceptance test in Russia



provided a solution for power distribution (medium-voltage distribution based on Siemens NXAIR, low-voltage distribution based on Sivacon 8 PV switchgear). Secondly, a range of different Siemens divisions worked together in a global team to coordinate the migration to Siemens technology, which included project management, hardware and software engineering, cabling, installation and commissioning. Other vital additions were the decentralized Simatic ET200M module with Safety Integrated, and Profibus Network or Profinet Network connections for all components. And finally, Siemens also delivered a global solution based on Simatic PCS 7 Process Historian, which covers the entire glass coating line and products from a range of OEMs (Interpane, Hegla, Benteler, Grenzebach). Martin sums up the experience with following words: “We were more than satisfied because we had found precisely what we were looking for: expert standardization and global support.”



Sustainability up close

Efficient engineering: the components and modules were designed so that they can be reused in future projects – a tried-and-tested formula in mechanical engineering.

Fully equipped for the future

With the help of Siemens Solution Partner ACSI, Beatson Clark in the UK has introduced a state-of-the-art process control system based on Simatic PCS 7.



Sustainability up close

Thanks to the Simatic PCS 7 solution, the second furnace at Beatson Clark's plant can also be upgraded when required and integrated into the plant-wide control system.

In Rotherham, England, Beatson Clark produces over 500 million glass containers every year for the pharmaceutical and the food and beverage markets. When one of the two main furnaces at the manufacturing facility was approaching the end of its lifespan, the company's management took the opportunity to examine how best to improve what was also an aging legacy control system. The new standardized approach with a centralized process control system lays the foundation for future upgrades on site and provides a flexible platform that allows future add-on tools – such as energy monitoring.

Islands of automation

Previously the site had consisted of "islands of automation," that is, a variety of components and manufacturing elements controlled from various stations via a range of different tools and techniques. It was therefore nearly impossible to gain a coherent overview of the production facilities.

Following extensive consultations with ACSI and Siemens, Beatson Clark decided on a solution based on Simatic PCS 7. Siemens expert Martin Coley advised Beatson Clark in the search for the right solution. "The PCS 7 supports a standardized software approach using standard library functions. This helps create the sought-after integrated plant automation and 24/7 availability," says Coley.

Dave Douglas, Technical Director at ACSI, adds, "The new system gives Beatson Clark a greatly improved overview of automation functions. It also forms the basis for a scalable solution that supports future plant expansion. The standardization strategy also helps in keeping tabs on the lifecycle costs associated with the system."

Migrating to the Simatic PCS 7 solution ensures that the second furnace at the plant can also be upgraded and integrated into the plant-wide automation system in due course.



With the new centralized process control system based on Simatic PCS 7, Beatson Clark's bottle and glass container production is now more efficient than ever.

About ACSI

The Siemens Solution Partner ACSI planned, programed and installed the plant-wide automation system for Beatson Clark. With head offices in the United States and the United Kingdom, the company integrates information and control systems for over 40 customers worldwide and offers a comprehensive range of services, including on-site employee training.

More and more automobile manufacturers are opting for the FY brand of special glass from Fuyao Group.



Fuyao Glass Industry Group Co., Ltd. has patented numerous special glass products for the automotive sector. The group's research focuses on pioneering new products (e.g. solar glass roofs), technology (e.g. thinner toughened glass), equipment (e.g. bending furnaces) and materials (e.g. ceramic and silver). This investment in R&D has produced innovations such as glass roofs for vehicles that absorb and reflect sunlight to lower the inside temperature. Or even photovoltaic glass roofs that allow energy savings. The group has also developed a range of windshields with high-performance properties, such as windshields made of acoustic glass or ultra-light laminated safety glass. Then there are even windshields with clever functions, such as rain detectors to activate wipers, heating filaments to defrost and eliminate smearing, or solar absorption and reflection to lower the vehicle temperature – to name just a few of Fuyao's trendsetting glass products.

Stepping up a gear

Fuyao Group is China's largest manufacturer of automotive glass. In response to growing demand the company is currently expanding its global production capacities.

When Cho Takwong founded Fuyao Group in China in 1987, few could have predicted that 30 years later the company would have become a major group employing 16,000 staff members in China and around the globe. Today, the business is led by Cho Takwong's son, who took over the reins in 2007. The group includes ten Chinese production sites and a Russian plant commissioned in 2013, with further locations planned in the United States and Brazil. This expansion is largely thanks to strong global demand for specialist automotive glass, particularly in emerging markets like Brazil. Fuyao already dominates China's automotive glass industry with a mar-

ket share of over 70 percent, while international customers include Audi, Bentley, BMW, Daimler, VW and many more.

Siemens as co-driver

As one of the world's leading manufacturers of automotive and industrial glass, Fuyao has a long history of collaborating with Siemens to standardize operations in its glass processing plants. A number of Fuyao's locations currently use Simatic controls in their glass plate production lines, and Simatic WinCC software is installed to provide a scalable process visualization system for monitoring automated processes. Siemens has also provided a wide

array of drive technology in the form of Simotion Motion Control Systems, together with Sinamics frequency converters.

The particular advantage with Siemens is that the company is already active in all of Fuyao's expansion markets. So the groundwork is already in place for Siemens and Fuyao to take their collaboration up a gear – on an international scale. Possible projects include the installation of site-wide automation in plants, complete with financial services and project management – all from a single source.



All photos: O-I

The new innovation center at O-I's headquarters in Perrysburg, Ohio

Dotting the i's on innovation

The new innovation center at O-I in Ohio is on the right lines with end-to-end automation and drive solutions.



Sustainability up close

O-I set itself the targets of reducing energy consumption by 50 percent, increasing the proportion of recycled glass in its glass containers to an average of 60 percent, and lowering emissions by 65 percent, all while improving safety in the workplace. A number of initiatives to achieve these goals are already in the offing.

Those who are familiar with Owens-Illinois, Inc. (O-I) will know just how much the global market leader invests in research and development for its glass container production. But if anyone needed convincing, the new innovation center at its global headquarters in Perrysburg, Ohio, is a testament to this dedication. The center houses two new lines: one to produce innovative samples for customers, and one for O-I scientists to optimize production processes and test potential breakthroughs under real operating conditions. This research then feeds into the expertise of O-I's 77 plants across the globe.

Thanks to a long history of working together with Siemens on automation and drive solutions and power distribution products, managers at O-I did not have to think twice when opting for plant-wide automation in the new

innovation center. This highly effective concept covered all internal plant sections, as well as those from external suppliers.

Satisfaction – all along the line

"Siemens has the global footprint and automation products to match our needs – all along the line. The company not only has a complete line of high-caliber, reliable products, but also protects our intellectual property, can provide application knowledge, is able to give long-term support, and even offers value for money," summarizes Dale Gaerke, Director R&D Controls & Electrical Engineering at O-I. "With Simatic Process Historian, we have a powerful long-term archiving tool that is perfectly compatible with the WinCC Scada System. Process data and reports can be archived centrally, and in real time – with no extra engineering required. That is a great help

for our researchers in analyzing what factors influence our processes."

O-I uses a variety of Siemens solutions, including: the Scada software Simatic WinCC as an innovative, scalable process visualization system with powerful functions for monitoring automated processes, Simatic S7 modular controllers, Simatic ET200 as a decentralized peripheral system, Profinet, the Sinamics G120 modular drive inverter, the Sinamics S120 modular servo drive, Siemens industrial PCs, and Simatic HMI panels. What's more, O-I is now also equipped to accelerate its entire process from product design to delivery, thanks to Siemens' integrated portfolio – giving it a decisive competitive edge.



The Sitrans P DS III pressure transmitter measures furnace pressure at O-I in Maastricht.

O-I replaced the original isolated solution with Siwarex weighing modules, which could be integrated directly into the control unit for the batch houses.



Quality calls for precise measuring technology

Whether measuring level, pressure or flow rate, process instrumentation from Siemens has proven its value time and again at O-I in Maastricht.

In Maastricht, the Netherlands, O-I produces clear glass containers for the food and beverage industry. In two batch houses, sand, sodium oxide, lime and other raw materials are weighed out and sent to the mixer. Two years ago, O-I replaced the weighing system for these input materials with Siwarex modules, which are integrated directly into the batch house controls. "The old weighing system was truly a black box for us. We were completely dependent on the supplier for technical adjustments and maintenance. Because we wanted to be independent from any supplier for our maintenance, we opted for an open system instead," says Maintenance Manager Paul Thomas. Each batch house is now run by a Simatic S7 300 controller, together with the individual Siwarex weighing modules. The controllers can be operated remotely, or on

the operating panel in the control cabinet. All in all, the system is geared towards maximum availability. Moreover, the Siwarex modules are all interchangeable and compatible with one another. In the event of a malfunction, O-I's in-house mechanics can simply exchange them. "The new weighing system surpassed all expectations, right from the very start. The measuring process is now a great deal more precise than ever before," says Thomas. All this makes the glass melt more stable and cost effective. After all, with large daily volumes of input material, any deviation in weight can be very expensive.

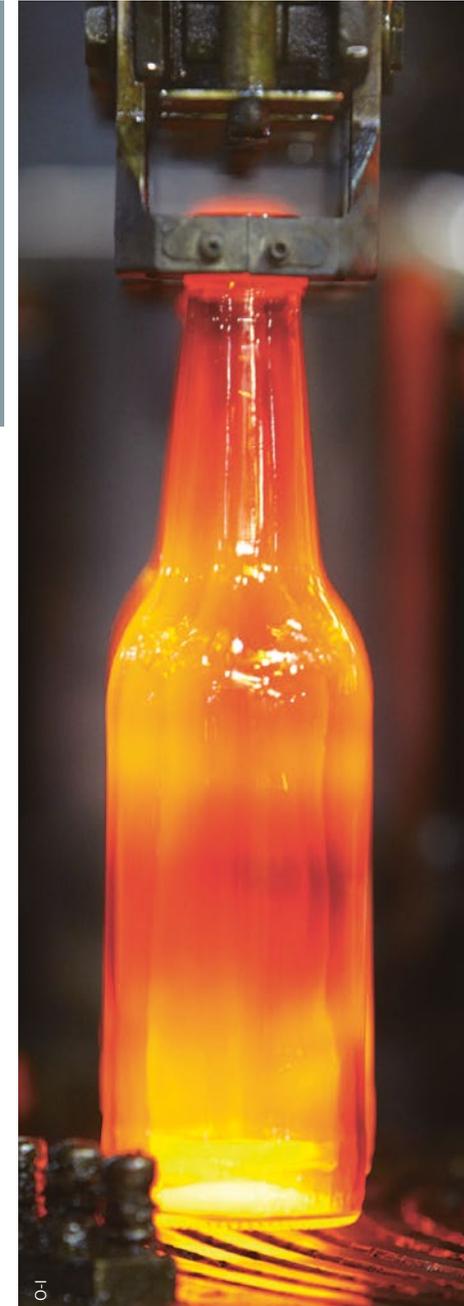
Reliable solutions

Siemens was not only able to improve the weighing process in Maastricht – the company has also contributed to all levels of automa-

One thing's clear

"We know from experience that Siemens solutions are reliable and that the individual products will be available for years to come. And it is not hard to come by technicians who can maintain and program Siemens products."

Paul Thomas, Maintenance Manager
at O-I in Maastricht



About on/off engineering gmbh

on/off engineering gmbh, one of four companies in the on/off group, was founded in Hannover in 1988 as a product- and system-independent engineering firm for automation technology. Since then, the company has developed into a leading provider of process automation engineering services. Today, on/off engineering gmbh employs over 140 staff members and has several branch offices throughout Germany, meaning it is never far from its customers. The company's services include all tasks relating to process automation, spatial/process monitoring, computer validation, MES solutions, instrumentation and control management, control cabinet construction, assembly and supervision. on/off develops tailored concepts according to individual customer requirements, all from one source: starting with systems consultation and analysis, followed by project planning, all the way to a complete turnkey solution. Plus, on/off is naturally at hand for its customers for service and maintenance. Existing customers include medium-sized and larger businesses in glass production and a number of other industries. From the very start, the on/off group has been a long-standing certified Siemens Solution Partner for automation, also in the categories "specialist" and "industry."

Crystal-clear thermal processes

Thanks to new automation and process control, the Siemens Solution Partner on/off has ensured high availability, transparency and efficiency in Barberini's melting and cooling processes for glass lenses.

Barberini GmbH in Grünenplan – the German subsidiary of the Italian ophthalmic lens manufacturer – has expanded its production capacity with a fifth melting furnace. One of the priorities of the project was to make the thermal processes for melting and cooling transparent and easy to operate, while ensuring high availability. The Siemens Solution Partner on/off engineering gmbh, headquartered in Wunstorf, Germany, was able to provide a solution that met all of the operator's requirements. on/off worked together with the plant's former owner and current service provider, Schott AG, and the entire project was planned and completed in only 100 days. That amounts to as little as one-third of the timeframe for most projects of this type. The core component of the solution is the Process Control System Simatic PCS 7 with a redundant Simatic S7-400H, which was equipped with an extremely user-friendly operating and monitoring concept for the plant operator. An operator and engineering station now enables thorough diagnosis and simplifies maintenance work. The redundancy of the control unit (Simatic S7-400H), the two servers (IPC547D industrial PCs) and important field components (connected via Simatic ET200M) means there is no need for an emergency manual operating level, which significantly reduces costs. A further cost-saving feature

comes in the form of software controllers to replace hardware controllers.

Future-proof as standard

One of the operator's main reasons for installing standardized Siemens hardware and soft-

ware components from end to end is that they are used in practically all industries across the world. A major supplier like Siemens is also able to ensure availability of spare parts throughout the long lifecycle of the new furnace, as well as migration to future systems.



A healthy decision

Schott Schweiz AG has migrated its glass forming machines for pharmaceutical applications to Profinet and the TIA Portal for a sustainable competitive advantage.

Schott Pharmaceutical Packaging is one of the world's leading suppliers of primary packaging for parenteral products in the pharmaceutical industry. Every year, over 600 production lines in 13 countries across the globe manufacture more than nine billion syringes, vials, ampoules, cartridges and specialized tubing glass and polymer items. Schott continually strives to meet the exacting quality standards in the pharmaceuticals industry – for example by optimizing its hot forming process. The machine technology used in glass forming is developed in Schott's Technology Center in St. Gallen, Switzerland, and distributed to production sites around the world.

Gaining a competitive edge

"We wanted to improve our competitive position in a sustainable way, so we set ourselves the goal of optimizing our hot forming process in terms of quality and efficiency," explains Ricco Thalmann, Automation Team Leader at the St. Gallen Technology Center.

As a long-standing partner, Siemens was called upon to modernize the existing plant in cooperation with Solution Partner WITO Automation, based in Weinfelden, Switzerland. Together they provided an array of solutions and products to realize Schott's goal.

Pioneering the field with the TIA Portal

Cost efficiency and sustainability are the nuts and bolts of special-purpose machinery (quick time to market and ability to adapt to demand). Schott was therefore one of the first customers to benefit from the TIA Portal as an engineering platform. Siemens also provided Simotion as the motion control unit for single-axis application, Sinamics S120 for various servo drives and asynchronous drives, Simatic S7-319F for system control and safety functions, Simatic ET200S decentralized peripherals, a Profinet communications platform, the Simatic HMIs TP1900 Comfort for visualization and Mobile Panel for setup mode, Sitop UPS500S for uninterrupted power supply, and an array of servomotors and sensor systems.

Solution sets a new standard

Schott soon found that the investment had paid off (see "Transparent sustainability"). And the upshot is: the solution provided will now set the standard for all new machines and upgrades at Schott.



Transparent sustainability

Andreas Christen (Project Manager), Ricco Thalmann (Automation Team Leader) and Beat Lang (Applications Engineer) from the Engineering Division at Schott Pharmaceutical Packaging in St. Gallen, Switzerland, outline six aspects of Schott's operations that have been sustainably improved thanks to Siemens:

Total operating costs

By retrofitting the plant, we have been able to significantly reduce our total operating costs. This gives us a distinct competitive edge.

Employee safety

The plant now meets the latest safety standards.

Availability of spare parts

The plant is fitted with the most up-to-date components. This ensures that all parts remain available for many years to come. And thanks to Siemens, we can also count on global support.

Standardization

The production facilities, and the automation concept in particular, have set a new standard at our plant thanks to the latest technology. This will shape our operations in the future.

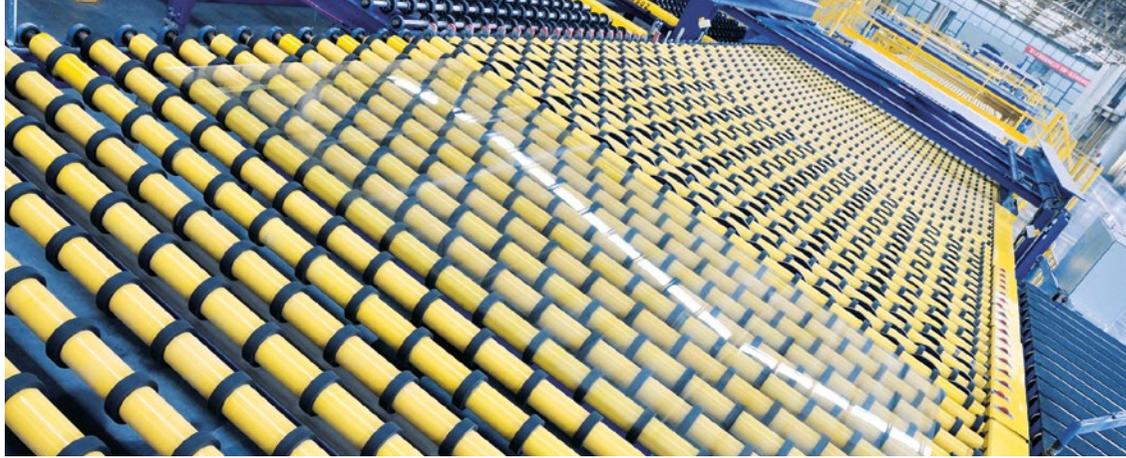
Energy efficiency

The plant was equipped with the latest drive technology. The annealing oven was fitted with an energy-efficient heating system, resulting in approximately 20 percent cost savings.

System availability

Downtime is reduced thanks to online access via intranet, troubleshooting is simplified through Profinet diagnosis and memory cards, and the plant is particularly easy to service.





Bottero is one of the leading suppliers of complete solutions for the cold end of float glass lines.

Complete standardization at the cold end

Bottero has fully equipped its machines – from the conveyor and main line, all the way to the stacker – with automation and drive technology from Siemens.

Bottero Group is a leader in many areas of the global glass industry, and it is also the largest supplier of complete solutions for the cold end of float glass lines. Today, Bottero machines are top sellers around the world. As the group's sales volumes grew, so too did the need for standardized and modular solutions in order to meet customers' diverse requirements.

This move also enabled a reduction in lead time for manufacturing and testing machines, both in-house and on-site. Bottero has subsequently decided to dispense with specific hardware and software. Instead, the machines are automated and driven by standardized, modular solutions from Siemens. This is good news for Bottero's customers, who only need to know one name for spare parts, anywhere in the world.

Redundancy guarantees availability

The cold end comprises three areas: the conveyor for transporting and cutting glass plates, the main line for processing, and the stacker. All of these areas are operated decentrally with separate Siemens control units, which are interconnected in a redundant Profinet network. "We decided on a redundant solution to ensure system availability," says Alberto Masoero, General Manager of Bottero's Flat Glass Engineering Business Unit. If one of the control units should be out of operation, then another control unit can take on its tasks at any time. A higher-level PC network handles optimization, control and monitoring of technical processes (Scada), as well as data collection.

The conveyor and the main line are automated by Simatic S7-300 modular control units.

Sinamics S120 modular servo drives regulate the movement of the conveyor, and ensure precise positioning of the glass plates. For loading glass onto transport racks, both robots and Cartesian gantry systems are used. The gantries are equipped with a Simotion D axis controller. The Simotion functionality for this controller is integrated directly into the control module of the Sinamics S120 drive system. The entire control and drive system is therefore exceptionally compact and responsive. Every robot-controlled stacker unit is equipped with modular Sinamics S120 drives and a S7-300 controller unit that, via Profinet, coordinates the robot's behavior. Each gantry and robot can also function independently as a stand-alone unit. This allows glass manufacturers to easily update their cold end – whether from Bottero or not – with a latest-generation Bottero stacker.



The Bottero Group headquarters are located in Cuneo, in Italy's Piedmont region.

Multitasking all along the line

Benteler uses the Premium-CNC Sinumerik 840D sl to control entire lines for automotive glass processing.

Benteler Maschinenbau GmbH, located in Bielefeld, Germany, is a subsidiary of the international Benteler Group, a renowned supplier in the global automotive and glass industries. The company's product portfolio includes fully automated lines for automotive glass – producing both OEM glass as well as spare-part glass.

Whether for windshields, side windows or rear windows: Benteler's lines can load, cut, break, grind and



drill automotive glass. The lines have a modular design and can therefore be extended easily by one or more sections. The company's lines are now equipped with the premium CNC controllers Sinumerik 840D sl and the latest drive technology from Siemens.

CNC premium class

The Sinumerik 840D sl is a high-performance, computerized numerical control system (CNC). Thanks to its flexibility, the system is ideal for implementing multitasking concepts. A particular benefit for Benteler is the controller's many channels. Up to ten machining channels allow all machines and modules to be controlled simultaneously, meaning the entire line is automated with just a single controller.

"The Sinumerik 840D sl is precisely the right product for our high-end machines," says

Andreas Lüdtkke, Group Manager of Software Development and Electrical Engineering for Glass Technology at Benteler. For Lüdtkke, the solution offers two main advantages: "Thanks to the multi-channel function, we can handle cutting and breaking operations parallel to each other. This reduces cycle times and helps us achieve greater productivity. We also no longer need local PCs for operating the machines and can work exclusively with Sinumerik's integrated user interfaces." The concept is based on drive technology by Siemens: Sinamics S high-performance converters and Simotics S servomotors. Benteler uses both Sinamics S120 built-in units in the common control loop and individual Sinamics S110 power modules as auxiliary axes.

Benteler's fully automated CBG (cut, break and grind) lines are designed for manufacturing windshields, side windows and rear windows. The machines are constructed according to individual customer requirements.



The Sinumerik 840D sl from Siemens sets the standard in the CNC premier league. With as many as 31 axes and up to 10 machining channels, the system can unite various technologies in one multitasking concept. In combination with NCU link, it is even possible to control 93 axes and 30 machining channels.

New Simotion generation boosts productivity

Forvet has automated all of its flat glass machinery using Motion Control systems from Siemens.

The municipality of Volvera, near Turin, is renowned for its machines used in flat glass processing: The Italian manufacturer Forvet has produced machining centers since 1990 for cutting, grinding, polishing, drilling and milling flat glass. To equip their globally exported machines with reliable and consistent control, and to ensure top performance, Forvet uses Motion Control solutions from Siemens. Simotion D axis control systems and Sinamics drives now come as standard in the machines.

Better performance

Retrofitting clearly pays off. Forvet has only recently migrated its machines to the latest generation of control systems, but yet the Simotion D4x5-2DP is already offering greater performance for the same cost. For larger drive assemblies, the Control Unit CU320 has now been replaced by the controller extension CX-32-2, which does not require a Compact-Flash card.

Forvet is continually enhancing its machines with new technology and functions. The Francesca glass working center, for example, now comes fitted with an optional water jet cutting head. Using high-pressure water jets (up to 3,800 bar) and a garnet cutting abrasive, the machines can cut glass plates with thicknesses between 3 mm and 25 mm. High-precision motion along the x- and y-axes makes any cross-section possible, with a minimal cutting radius of 1 mm.

Complete production lines

Forvet also offers its customers the option of having individual loading stations, cutting tables and various other machining centers linked to fully automated production lines. These are then controlled by Siemens IPC 677C industrial computers, which communicate with the production line's higher-level control system via Profinet. The Profinet connection is used to send control commands for operating the machines and to gather production data.

Forvet now offers its Francesca machining centers with optional integrated water-jet cutting.



Quick production of triple-insulating glass

Bystronic glass's machines achieve excellent cycle times with automation solutions from Siemens.



Bystronic glass is famed for its pioneering machines, systems and services for the processing of architectural and automotive glass. Headquartered in Neuhausen-Hamberg in the south of Germany, the brand's companies are active across the globe. In 1994, Bystronic glass became part of Conzeta AG, a renowned Swiss industrial holding company.

There is a clear trend today for triple-insulating glass, which is hardly surprising: it has significantly better insulating properties than traditional double-insulating glass, and therefore improves energy efficiency in buildings. The brand name Bystronic glass is famed for its extremely quick production of triple-insulating glass. The new production line speed'line can

manufacture triple-insulating units in the time it takes other lines to produce double-insulating glass. Like other Bystronic machines, speed'line is fully automated with solutions provided by Siemens.

Drive technology from a single source

"Manufacturing triple-insulating glass in quick cycle times depends on three individual stages: applying the spacers, filling the cavity between the glass panes with gas, and sealing the units," explains Jürgen Schnorr, Head of Electro-Mechanical Design at Bystronic glass. Each production step is handled by specialized machines, which are controlled by the Simotion Motion Control System. All drive components, including Sinamics converters and Simotics servomotors, are fully coordinated – in line with Siemens' Integrated Drive System concept (IDS). Higher up the control hierarchy, the Simatic automation system is used to control the entire production line.

Automated application

With speed'line, the application of the TPS (thermo plastic spacer) is completely automated. Two machines arranged one after the other position the spacer almost simultaneously on glass plates two and three. The advantage of TPS is that no separate pre-production stage is required; the spacer is instead applied in one strand directly to the glass pane in a patented process at a temperature of approximately 120 degrees Celsius. This method allows built-to-order production without loss of cycle time. The manufacturers do not have to divide the orders into standard and special formats, or subsequently sort the units. Thanks to Simotion control, the machines operate at maximum throughput. Plus, with the top-loading application provided by the Simotion Handling Toolbox, even complex window shapes can be manufactured with ease. G-code, the programming language commonly used for CAD applications, can be run directly.

The new speed'line production facilities from Bystronic glass are designed for quick production of triple-insulating glass.



Flexible control for the hot end

Heye controls manufacturing processes for container glass using the Simotion Servodrive – based on the Simotion motion control system from Siemens.

All photos: Heye

Heye International GmbH, headquartered in Obernkirchen, Germany, is a global player in the container glass industry. The mechanical engineering company markets its products for the hot end of the forming process under its HiPerform brand. What matters most to Heye's customers is high plant availability. Each day, a total of up to 400 tons of glass per melting oven has to be formed into the desired shape. The plants operate around the clock, producing up to 700 bottles per minute. Continuous operation and a quick changeover of container type require a highly flexible controller: the Heye Simotion Servodrive, based on the Simotion motion control system from Siemens. Heye now offers a highly space-saving version of the controller:

the Heye Simotion Servodrive Compact, which is suitable even for small control cabinets. It is based on Siemens' Simotion D (D = drive-based), which combines control and drive in one unit, making it much more compact than other motion control systems. This customized solution is available for installation in new lines, and with its compact design it can also be retrofitted easily in existing glass facilities.

Flexible and user-friendly

With the Simotion Servodrive, Heye is able to control various hot end components quickly – for example the plunger, dual motor shear, gob distributor, product transfer, cross conveyor and lehr loader (annealing lehr) – and sequence operations with precision.

The plunger ensures the hot glass is evenly spread. The shears cut gobs with precisely the same weight. The glass gobs are then distributed to the various stations of the individual section (IS) machine via the distributor system. Still hot, the finished glass bottles arrive on the conveyor belt and head to the lehr. A Siemens touch panel allows users to operate the Simotion Servodrive with ease. The panel is employed, firstly, for setting machine parameters: using the touchscreen and article databases, the operator can switch quickly to a different type of container. Secondly, the panel informs the user of operating conditions and system reports.



Whether operating the plunger, dual motor shears or gob distributor (from top to bottom): the Simotion Servodrive can control the various hot end components with precision.

Services





A commitment to service

Optimized availability, projectable operating costs and improved productivity – with Siemens’ services for industry customers.

The glass industry faces ever-greater challenges: high energy and raw material costs, growing competitive pressure and stricter environmental regulations, to name just a few. As a result, efficient and transparent production is more important than ever. Plant operators are therefore on the lookout for ways to tap their plants’ full potential. Above all, this means saving energy and resources, while reducing costs – without compromising product quality.

Expertise for success

Engineering specialists can play a vital role in responding to these challenges by optimizing

plants with targeted upgrades and modernization. They are able to minimize production limitations through remote maintenance and condition monitoring for entire plants. Such expertise has become a decisive factor for competitiveness and success in the industry today.

Industry know-how

Siemens helps its customers to optimize their competitive position by offering a comprehensive service portfolio. Siemens’ specialists offer services for a plant’s entire lifecycle: from planning and engineering all the way to the

operating cycle. In addition to conventional maintenance and repair services, the portfolio also includes energy-efficiency management, condition monitoring for large drives, IT security solutions, servicing of entire plants or factories, and even financing by Siemens Bank for entire projects.

Services at a glance

In the following pages, GlassFocus provides an overview of Siemens’ services with examples of services for plant availability, continuous operation and financing.



Plant availability
up close

Selected services from Siemens

Ensuring plant availability

- ▶ Technical Support
- ▶ Simatic PCS 7 Lifecycle Services
- ▶ Simatic System Assessment/Audit

Continuous operation

- ▶ Asset Optimization Services
- ▶ Original Spare Parts

Finding financing solutions

- ▶ Financial Services at a glance
- ▶ Reference project: NSG



Support for drive solutions

Not only do Siemens' motion control specialists produce drive solutions, control units, motors, frequency converters and condition monitoring systems – they also advise customers on planning, servicing, optimizing and modernizing their machines and plants. Customers are often unaware of the many options available to reduce a plant's energy consumption, such as speed-controlled motors or Sinamics energy-recovery frequency converters. In addition to the 295 Motion Control service points in 130 countries, customers can also access the Online Support Portal with over 260,000 up-to-date product data entries available free of charge.

Support on every level

Some problems are too complex to solve without help. And very often, every second counts. Technical Support from Siemens offers the right assistance for every task.



Plant availability up close

- ▶ **Technical Support**
Quick specialist help for all technical requests in a range of service packages

Whether for an unrecognized error message or a communication problem with the control unit – Technical Support from Siemens can be reached from anywhere in the world via telephone or online. Siemens specialists prioritize urgent cases and coordinate with colleagues in development or on-site services if required. Even if a product is unavailable or has been discontinued, Technical Support can still help.

A range of support services are provided as part of the following packages:

- ▶ **Basic:** Basic support is free of charge for support requests that can be solved within an hour. The service is available on weekdays during office hours, by telephone or via the internet.
- ▶ **Priority:** A customer advisor handles the telephone support request and then forwards the query to the next available specialist, who calls back within minutes.
- ▶ **24h:** The support service can be contacted around the clock, from Monday to Friday. A specialist returns the call within two hours.
- ▶ **Mature Products:** Siemens also supports customers whose products are no longer available.
- ▶ **Extended:** Complex cases that cannot be resolved within an hour are handled as "Extended" requests, and are processed separately. Examples include requests for project planning support, creating scripts or support for commissioning.
- ▶ **Desktop Assistance:** In Desktop Assistance, a specialist supports the customer via a remote connection or through the high-security Remote Services platform in Simatic automation systems.
- ▶ **Support contracts:** In an individual support contract, customers can arrange binding time and request quotas, and intervals for proactive preventive maintenance. This may include an analysis for a process control system, for example.



Simatic PCS 7 Lifecycle Services

Siemens offers a service concept divided into four categories for Simatic PCS 7, its state-of-the-art process control system. The customized service contract is comprised of services from four categories, and can be supplemented with options such as 24-hour service, spare-part plans and remote services.

- ▶ Standard Service: Online support (product information, instructions, FAQs), stand-by service, on-site repairs
- ▶ Maintenance Service: Inspection and preventative maintenance
- ▶ Basic Lifecycle Service: Spare-part supply, obsolescence management
- ▶ Extended Lifecycle Service: Modernization, update/upgrade services

The whole plant in good hands

Service contracts with Siemens guarantee effective serviceability and plant availability.

Throughout the lifecycle of a production plant, a number of expenses arise for servicing, inspection, maintenance, spare parts and software updates. Safety aspects, user management and adapting user applications are

also of growing importance in complex process control systems. Shorter innovation cycles are a challenge for specialists who have a thorough knowledge of the system and assure the plant's availability.

Extensive expertise

Many companies lack in-house specialists who are able to ensure appropriate servicing for complex automation structures. Often, it is simply not economical to train employees on specialized topics or to employ service experts. Many companies today rely on external service partners with industry expertise, such as Siemens.

As a manufacturer and supplier of process control systems, Siemens has precisely the expertise it takes and detailed knowledge of the sys-

tems. Whatever difficulties the plant faces, the right Siemens specialist is available at all times, throughout the entire lifecycle.

The advantage for plant operators: maintenance is carried out during on-going operation, the plant's efficiency is assured, and the costs for maintenance and modernization are transparent and projectable, thanks to fixed service contracts. This simplifies matters for the operator, prevents downtime and ensures productivity.

Siemens offers tailored service contracts to suit a wide variety of customer requirements.



Plant availability up close

- ▶ **Simatic PCS 7 Lifecycle Services**
A contract offers investment protection and assures the serviceability of control technology over a period of up to 15 years, all at projectable costs
- ▶ **Simatic System Assessment/Audit**
Plant condition analysis as a basis for ensuring serviceability

Simatic System Assessment/Audit

As part of Simatic System Assessment/Audit, specialists ascertain the precise current configuration and serviceability of an automation system. The Basic Check includes an analysis of weak points and risks, while in additional modules detailed reports are produced on the system status, giving recommendations for improving safety and system availability.

Original Spare Parts

Replacement parts can lead to production failure if they are not entirely compatible with products from other manufacturers. This is why Siemens offers original spare parts that are perfectly compatible with each other. The original spare parts meet the same quality guidelines as new parts, and they are available for a further ten years after product marketing has been discontinued.

To ensure replacement parts reach their destination as quickly as possible, Siemens works with a global logistics network and offers a range of order

procedures: Standard, Plant Shutdown, and Emergency Service.

The spare-part service is available worldwide, around the clock, 365 days a year. The logistics experts at Siemens ensure that orders are delivered on time, and they take care of transportation, customs clearance, storage and order management, spare-parts management, and logistics planning and management. Siemens also offers individual spare-part packages and preventive spare-part storage.



Cost transparency and availability

Asset Optimization Services enhance spare-part supplies and offer transparency. A lack of spare parts, or the wrong parts, can lead to production failure and therefore to considerable financial loss.



Continuous operation up close

- ▶ **Asset Optimization Services**
Cost transparency and optimized spare-part supply
- ▶ **Original Spare Parts**
Flexible ordering procedures for spare parts, according to different urgency levels

Spare-part stocks are central to plant availability and productivity. But they also involve high costs. Plant operators often keep surplus stock when the availability of spare parts is uncertain – or if there is a risk of replacements being unavailable for a product after the end of its lifecycle. Conversely, after plant modernization there is often the problem of stockpiled spare parts no longer being compatible with the installed systems. Many businesses underestimate the options available to them for optimizing their spare-parts inventory and logistics. A great deal of money can be saved by striking the right balance between meeting technical requirements and ensuring cost efficiency. Siemens offers a service package – Asset

Optimization Services – that enables a structured and systematic approach to spare-part supplies.

Step by step

First of all, Siemens analyzes spare-part supply on site and records an inventory of the components currently installed in the plant, as well as the spare parts in stock. Siemens also accounts for spare parts that are awaiting repair and are therefore not included in the inventory. Then a comparison between the inventories in the plant and the warehouse reveals both surpluses and shortages. In a further step, the specialists from Siemens produce a spare-part and stock-keeping concept, taking regional and central

warehouse structures into consideration. After implementation, financial resources are freed up, and cash flow is improved.

Modular concept

The individual phases of the optimization concept are designed as modules, and they can be carried out individually – at transparent and projectable costs. This allows customers to take advantage of just the analysis and concept services, for example, while implementing the recommendations themselves. In addition, Siemens also offers a regular analysis of spare-part inventories to keep the customer up to date at all times on the current status of stock received and issued.

Financial Services at a glance

Siemens Financial Services (SFS), a subsidiary of Siemens AG, is an international provider of financial solutions. SFS employs around 3,000 people worldwide.

SFS offers:

- ▶ Financial Advisory & Structuring
- ▶ ECA-covered financing solutions
- ▶ Project Finance
- ▶ Vendor Finance
- ▶ Equipment Finance & Leasing
- ▶ Debt
- ▶ Equity
- ▶ Working Capital Finance
- ▶ Leveraged Finance
- ▶ Venture Capital & Private Equity
- ▶ Trade Finance Advisory
- ▶ Asset Management
- ▶ Insurance



Financial Services up close

The tailored financial solutions offered by Siemens Financial Services (SFS) are designed to perfectly match Siemens' portfolio.

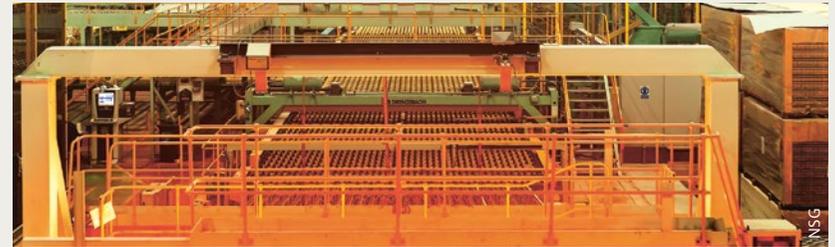
Financial security

Investments are essential to maintaining a competitive edge. With flexible financing solutions, operators can spread the costs involved over several years.

When it comes to modernizing a plant, or even upgrading to the latest control system, financing can be an important factor for a lot of customers. Very often, the high costs involved or the risk of unplanned repair work deters operators from making large investments. Yet investments are essential for a business to remain competitive in the long term.

That is why Siemens not only provides technical solutions and advice, but also has a unit that assists customers with extensive financial expertise – Siemens Financial Services (SFS). The result: the customer gets an invaluable combination of technical expertise, advice and financing solutions, all from a single source. SFS has a broad range of financing instruments and supports its customers with tai-

lored financial solutions, in cooperation with regional or international banks if required. Yet these services are not only available to customers constructing a new glassworks or purchasing new machinery – financing services are also provided for modernizations to improve operating costs. The range of instruments includes loans, leasing models where costs are spread out over several years, and managed service-based structures, such as energy-saving contracts where the cost of financing is paid back out of the savings achieved. Thanks to an international network of companies and access to international financial markets, the experts at SFS are in an ideal position to develop customized financing concepts and offer highly competitive financing solutions.



NSG: Solid financing for optimized production

For NSG, the advantages of a service contract with Siemens are clear: savings of €1.2 million within three years.

The glass specialist NSG Group, which includes the renowned Pilkington brand, is traditionally a very high energy user and faces substantial annual energy bills. Reducing costs and improving operational processes have therefore been a consistent goal in the manufacturer's drive toward a low-carbon and sustainable future. An important step in this direction was provided by the Siemens Energy & Environmental Service – a customized package including analysis, consultation and the implementation of energy-saving measures. First of all, engineering teams from Siemens and NSG carried out a series of energy audits. The result was an initial list of ten energy management projects, which included the installation of new drive technologies and automation controls at a Scottish production site, and a major program to install an intelligent lighting solution at one of the company's prime warehousing locations. To finance these measures, NSG took advantage of a tailored solution from Siemens Financial Services (SFS). SFS provided the initial capital, and NSG then simply paid a monthly charge from the savings achieved. All financing was repaid over a contract period of three years, and NSG now reaps the full benefit from its reductions in energy costs.

Gary Charlton, Operation Director at NSG: "We wanted to reduce our energy costs. Our engagement with Siemens was built upon an initial visit to a Siemens manufacturing site in Congleton. I was impressed with what I saw. Very importantly, we did not have to make any up-front capital expenditure investment to benefit from the installed technical solutions. Our savings financed all measures introduced. Such flexibility is a key factor and it represents a risk-free option for us."

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Subject to change without prior notice
Order No.: E20001-A190-T112-X-7600
Dispo 41513
Printed in Germany
© Siemens AG 2014

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