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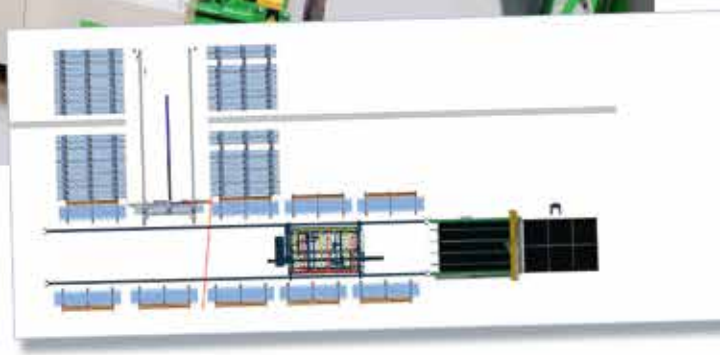

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Glaston at VITRUM

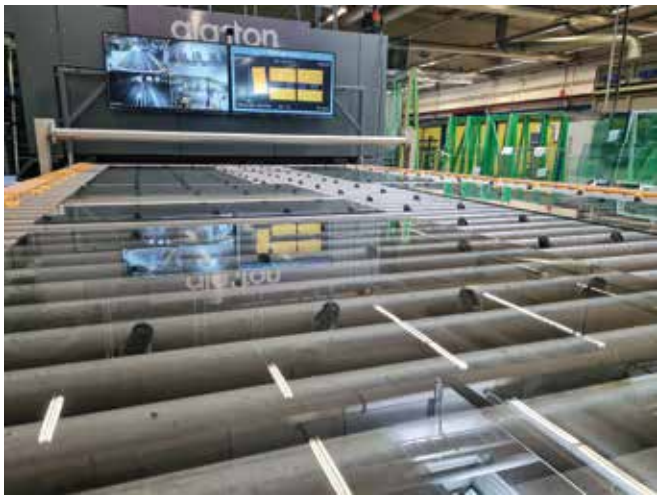
After the long break, we're happy to meet you once again in person at this year's VITRUM! It will truly be a welcome opportunity for us all to catch up and share news on the latest developments. We're looking forward to hearing more about your business. Let's celebrate being closer in touch – and explore ways for you to serve your customers even better.

MACHINERY

Flat tempering

This year, we have reached one of our main goals – the launch of the first flat tempering line based on the big data of our global installed base. Digitalizing the tempering process includes innovations such as online fragmentation prediction for every glass and white haze detection using artificial intelligence (AI). Our new tempering process Autopilot minimizes the need for operator input and offers process control without parameters.

By taking advantage of intelligence, you gain greater bed utilization, higher energy efficiency, repeatable quality and improved operational safety. Today, every machine can handle its own predictive maintenance, suggesting spare parts when needed.



Flat laminating

Our ProL full convection laminating technology is setting new standards for quality, yield and processing capability.

With the new Autopilot laminating process, your furnace independently learns to run in the most optimal way instead of having your operators make manual adjustments. With the growing trend of using structural interlayers, we've introduced new convection control technology for flat laminating, which offers a significantly wider operating window for even complex laminates.

Insulating glass manufacturing

The new arrissing machine MULTI'ARRISSER is a fast and user-friendly solution for the high- quality arrissing of glass edges. The cup wheels adapt individually to different edge geometries of

rectangular and shaped glasses.

Glaston's cup wheel technology has a 5–10 times longer lifetime than other systems. One cup wheel can be used for multiple functions – arrissing the edge, basic edge planing and corner dubbing. The wheels have a maximum arrissing speed of 60 m/min – the fastest single-head machine worldwide. You can process premium Low-E glass without any coated surface contact.

Glaston's advanced architectural glass TPS® (Thermo Plastic Spacer) technology provides processors with end products to satisfy the toughest warm edge demands. Insulating glass units made with TPS® improve energy efficiency in buildings, increase durability and reduce energy costs.

A major advantage of TPS® is its production flexibility. By directly applying the Thermo Plastic Spacer onto the glass lite significantly simplifies the processes for IG manufacturers. The entire production mix can be manufactured on one line using various TPS® IG production lines – from individually configurable solutions via fast system solutions with shortest cycle times to maxi size solutions for glass sizes up to 9 m in length.

Automotive and display glass processing

For thin glass pre-processing, we offer a thin glass kit to upgrade new and existing cells.

The new HYPERFEX grinding wheels represent a revolution in edge grinding with a holistic view of the entire glass pre-processing.

The new automotive machine generation CHAMP Evo offers two optimization features for higher precision and more dynamic movements – a linear drive instead of a spindle on the grinding machine and a honeycomb table on the grinding machine.

Our new active convection technology for heat treating automotive glass improves the processing of coated, printed and complex glass types and enables faster heating. The new Matrix Evo bending furnace is available with different size and capacity configurations to reduce cycle times. Our new HTBS bending and tempering system with the market's densest control matrix meets the highest bent tempered glass quality standards.

Glaston's digital services

Our digital services are designed to increase your production performance and help you avoid unplanned downtime.

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Virtual Engineer – an augmented reality-based solution that allows you to carry out service work or spare parts installation independently – under the live guidance of experts.

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HFT is pleased to announce exciting changes to its Sales Department effective immediately.

Sam Leaper has been promoted to Director of Glass Business Development. Sam has been with HFT for 4.5 years and has contributed to the continued success and growth of the business.

Sam will be leading HFT's Sales and Marketing Department as it continues to grow and offer global glass makers with turnkey project support and EPC solutions from initial conception, through development, design and execution.

Matt Rodgers joins HFT as Glass Business Development Manager. Matt has over 20 years' experience in Power, Metals and Air Pollution Control. From project feasibility to budgeting to proposal and start-up, Matt has held positions that handle and support these functions. With a Bachelor of Science in Labor Industrial Relations and holding an MBA, his background offers solid, knowledge-based support to help navigate projects from conception to conclusion.

As leading specialty engineers and contractors, HFT provides engineering, procurement and construction services to support all the project needs of global glass manufacturers, including full turnkey solutions. HFT is the ONE source partner glass makers have come to rely on to safely and efficiently execute major projects such as greenfield factories, expansions, reconfigurations, and cold repairs.

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HEGLA is showing the ProLam LSR, a newly developed cutting system for LSG equipped for the first time with the time-saving laser diode heating technology as a system in series production. Up to 20 per cent and more productivity can be achieved with the new technology.

Faster cutting, more information and perfect tempering

The HEGLA Group's range of topics at Vitrum could scarcely be wider, but it is an example of just how diversely the glass industry has developed in recent years. On the one hand, the focus is on glass cutting, its automation and performance increase. Interested visitors gain insight into HEGLA's mechanical engineering. On the other hand, the opportunities of networking, digitalisation and integrated processes will also be showcased, making it clear how important these issues currently are from the Group's point of view.

Laser diode heating increases productivity in LSG cutting

HEGLA is showing the ProLam LSR, a newly developed cutting system for laminated safety glass equipped for the first time with the time-saving laser diode heating system as a machine in series production. "Productivity in LSG cutting can be increased by twenty per cent or more with the new heating process," said HEGLA Managing Director Bernhard Hötger, emphasising one of the advantages of the new technology. The laser applies the bundled heating energy precisely to the cutting contour, reaching the PVB inerlayer's transformation temperature much more quickly than the usual heating tubes. The laser beam weakens only slightly as it passes through the interlayer, so that even demanding glass laminates of up to ten-ply interlayer can be separated with shorter processing times. The new process also has a positive effect on edge quality: the interlayer remains cold outside the cutting area, thus preventing later delamination and enabling additional cuts without cooling times. The system reduces energy costs as well. "The laser diode strip has a divided design, automatically adjusts to the cutting length, and requires only a short boot-up time," Bernhard Hötger added.

Unique glass marking for digital added value

Individual glass marking, data capture and

Demanding pane composites with up to ten-ply interlayer can be separated in a short cycle time with the new laser diode heating system. The precise application of heat to the cut contour means that the surrounding area virtually remains cold, preventing later delamination to the maximum extent possible.

storage, and product tracking are the main focus at HEGLA boraident. In line with this, the mobile laser printing solution ESGuardM will be shown together with the UniColor laser printing process. Compared to CO2 laser marking, this technology leaves the surface completely undamaged. Once the scratch-, smudge- and weather-resistant marking consisting of a logo, QR code or alphanumeric characters has been applied, it remains firmly attached to the glass. “Depending on the integration, the captured data on the product can be stored either in the ERP or another system. All it takes is one scan to retrieve the information, call up a fire protection certificate or reorder an identical product,” explained Head of Development Dr Thomas Rainer. As a rule, laser marking is integrated into operations step by step with the aims of triggering production steps through automatic scanning, simplifying shipping processes or tracing process steps from production and shipping to the construction site. “With marking and unique identification, it's also possible to fully digitise and track production,” said Dr Rainer.

Track & trace is put into practice at HEGLA boraident. Via automatic scan or manually with an app, production progress can be recorded and tracked even years later.

Real-time tracking for the optimisation of integrated processes

“Capturing processes in real time is also advantageous for higher-level software such as ERP, MES, waste optimisation and capacity planning,” said Dr Jan Schäpers, Managing Director of HEGLA-HANIC, the software specialists. The large amount of data collected by scanning and sensor technology can be used to analyse and optimise processes in depth. The display of information in a HEGLA-HANIC Cockpit helps to improve the employees’ overview and gives production managers an improved basis for decision-making. With appropriate integration into ERP and production planning software, many of these interventions take place automatically. For example, the continuous optimisation system continuously adjusts the cutting plans or rearranges the sequence of units at the processing steps according to current demand.

For visitors who want to get a personal impression of HEGLA-HANIC’s solutions on site, the company will show demo views and test systems at Vitrum –

Once the surface-friendly marking has been applied by laser printing, it remains permanently attached to the glass throughout the entire product life cycle.

With the HEGLA-HANIC Cockpit, performance-relevant information can be displayed and tracked. It gives employees more information and makes it easier for production managers to make decisions.

systems featuring even better performance and usability on a new platform with inclusive updates.

Perfect flatness and glass quality

Tempered glass in perfect optical quality and flatness is the passion of HEGLA-TaiFin, the HEGLA Group subsidiary that will also be represented at the joint stand. With the CTFe, the company offers a unique tempering furnace in which the thermal heat is transferred by air circulation from closed convection boxes. The glass surface is never exposed to the direct radiation of the radiant heaters, so that both coated and uncoated glass can be finished with the highest optical properties. “The Viprotron and LiteSentry scanners, for example, consistently confirm the premium quality of the tempered glass with isotropy values above 95 per cent,” said Jarno Nieminen from HEGLA-TaiFin. While the CTFe is ideally suited for demanding facade glazing, the Finnish company is now introducing three new furnaces that have been specially designed to meet the requirements of insulating, interior or sanitary glass.

You will find the HEGLA Group at Milan's Vitrum in hall 22P at stand U01-Z08.

Hegla.com

Glass that’s as perfect as it gets – HEGLA-TaiFin's claim regarding the performance of CTF furnaces could not be more passionate. This is why perfect flatness and optical quality are the hallmarks of these tempered panes.

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Industry demand for larger glass plants and the reuse of infrastructure has made projects more complicated. In most cases, when enlarging furnaces, modifying equipment or installing new technology there is little or no accurate documentation of the current structure available.

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This creates complications between the old and new, sometimes requiring complete structures to be refabricated – incurring additional costs and adding time to projects.

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Surveying the existing installation provides the detailed information we need to form a basis for the new 3D designs, including steel work, furnaces and forehearths, pipe work, cable trays and equipment.

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SORG | VALUE BY DESIGN

Why use blockchain and track & trace in the glass industry?

Automation and digitalisation are making their mark on glass as a product and on how it is made. They therefore require digital forms of tracking and methods to manage and exploit the glut of data being produced.

This has repercussions for everything from project management, production and internal logistics right through to the customer. The glass industry is also faced with the challenge of doing its part to meet objectives set in climate policy, i.e., how to approach recycling and a circular economy concept once a glass product reaches the end of its lifecycle. Disposal and demolition firms alike need information on how to handle, separate and reuse materials.

Navigating this new world means collecting and evaluating as much data as possible, ideally using digital technologies – and this is where track & trace comes in. This process begins from the moment a company receives an order and can be based on methods including laser marking – something that is offered by HEGLA boraident GmbH & Co. KG, for example. These methods make it possible to organise and optimize the internal steps involved in production and track both products and processes throughout the entire lifecycle.

A virtual ID is created in the production planning stage and then laser-printed onto the glass pane before cutting it. This ID takes the form of a data matrix code that is 99.9 per cent machine-readable. As processing continues, the glass is identified multiple times, the code is read and each reading process is shown in the higher-level production system, along with the location and time at which it occurred. This provides a seamless overview that makes it possible to intervene quickly if anything goes wrong. Not only that, but it prevents glass from going

missing and allows damaged panes to be remade quickly. The data programmed into CNC milling and drilling centres can be linked to each individual pane, cutting down on error rates caused by incorrect programming. It is possible to record every single piece of information about a pane, including the location where it is installed – a real asset later on if the pane has been damaged and needs to be replaced, or if it is going to be reused or recycled.

Creating links to customers

Laetus GmbH, a provider of hardware and software for quality control and track & trace systems, and Kezzler AS, which makes software for cloud-based applications, have chosen to follow a different path. The two companies have combined their track & trace technologies over as many as five different levels, with the aim of making end product information more transparent on the market through the use of QR codes (which act as digital fingerprints). This approach creates an added value for consumers, which in turn boosts sales: a study by MIT revealed that improving supply chain transparency results in a 2–10% increase in willingness to pay [Tim Kraft, León Valdés, Yanchong Zheng, 2019: Consumer Trust in Social Responsibility Communications: The Role of Supply Chain Visibility]*. The end customer is given a better insight into the manufacturing process, and / or can use digital platforms such as apps and websites to gain added benefits along with the product itself. This approach aims to foster more trust. For companies it also provides an opportunity to establish customer loyalty, enhance the reliability of the brand and quality standards, and prepare for developing products in the future. Production aspects such as recycling, the environmental footprint, supply chain monitoring and increased automation also play an important role. The system can be fully integrated into an existing production environment, even extending beyond the factory itself. It can end either in an interface with the customer's production management system or in a cloud application that end consumers can use.

QR codes as a tool to engage with consumers and to provide useful product information.

Blockchain technology – for more than just cryptocurrencies

As digitalisation becomes more widespread, data security is steadily gaining importance for companies. Originally used for cryptocurrencies, blockchain technology is now increasingly being considered for applications in product lifecycle management (PLM) and becoming more attractive for industrial applications. Instead of storing transaction data on just one server, this technology duplicates it for multiple parties worldwide known as miners. This concept is why blockchain is also referred to as distributed ledger technology in many cases. A chain of consecutive data blocks is created whose stored information cannot be altered as soon as it is digitally sealed. As the block size is limited, the technology cannot be used to transport large quantities of data. In cases where an extensive data file needs to be secured, the hash value associated with the file is used: this is stored in the blockchain and creates a unique relation to the original file. The blocks are linked to one another using a cryptographic method. Each miner stores a copy of the entire blockchain, which prevents attackers from changing or erasing the blockchain unless they were able to gain control over more than 50 per cent of the miners.

Smart contracts have made it possible to automate business processes in the blockchain by storing executable program codes. The principle is based on the "if-then" rule: when a customer makes his or her most recent leasing payment for a machine, for example, the machine is automatically released for the period that follows this. A benefit of this method is that business partners can interact directly with one another, without the involvement of intermediaries. Oracles come into play in cases where data from external sources containing third-party information needs to be incorporated into the blockchain so that a smart contract can be reviewed or executed. In this context, an oracle is a kind of translator or interface that verifies information using real-world facts and events, then transfers the data to the blockchain and makes it available for smart contracts to use. This means that oracles can act as a trigger for smart contracts, setting in motion certain processes.

Companies always have to start with deciding whether the blockchain method is appropriate for their needs. The example of Prostep AG, an expert in PLM processes and solutions, shows the application of blockchain for managing the right to manufacture certain components using 3D printing. The project known as SAMPL – Secure Additive Manufacturing Platform (https://sampl.fks.tuhh.de/en/home.html), which is being funded by the German Federal Ministry for Economic Affairs and Energy, considers copyright and product liability law as a means of distinguishing original copies from counterfeit ones, issuing licences, safeguarding printing rights and paving the way for new value-creation models and business models. A consortium led by Prostep and consisting of ten companies and institutions has produced the following results:

- The development of a trustworthy supply chain from the rights holder to the printing service provider and right through to the end customer (chain of trust)
- The development of a reference platform with blockchain and printer integration
- Blockchain technology for licensing, documenting printing process data and tracking components
- Component tracking by means of RFID chips, QR codes or other methods

This platform is based on a data exchange solution called OpenDXM GlobalX, which makes it possible to execute 3D printing orders worldwide on demand (for spare parts, as an example), license printing processes and process documentation, and use blockchain technology to ensure traceability and provide evidence of authenticity. It provides users with access to processes that use much less energy than bitcoin blockchains. "In addition to this application, there are numerous other ways in which blockchain technology could be exploited. To assess whether it would be suitable for an application, it's useful to apply the golden rule of four out of seven: in other words, blockchain is worth considering in the context of an application if it would bring four out of seven potential benefits", recommends Dr Martin Holland, Director of Strategy & Business Development at Prostep.

Blockchain in the glass industry

Turning to an example of a project involving glass production, a master's thesis being written by Thomas Lenze at A+W Software GmbH analyses options for capturing and managing data in insulating glass production that uses manual and automated processes. One potential application would involve an insurance company using a smart contract application to gain access to stress testing information after a hardening process, so that it can then ascertain the product liability risks. Requirements for digital documentation in the context of building information modelling (BIM) also need to be considered.

The process chain is made up of the cutting and prestressing stages, along with the heat soak test, insulated glass production stage including the auxiliary materials and all the serial numbers, with everything working on the basis of the barcode on a single pane. The process as a whole involves recording data, assigning the barcode ID and linking this to the overarching system. This covers everything from the glassworks material batch, the individual pane assignments, the curing oven temperature/time profiles and the heat soak oven to the batch numbers for the sealants.

If this data is provided in a blockchain, it then becomes possible to create any number of channels that each deliver certain items of information to certain users, such as the insurance company in this case.

The contents of this article were the subject of an event held in June 2021 by the VDMA Research and Technology Industry Working Group, part of the Glass Technology Forum. The working group meets several times a year and discusses technical developments in mechanical engineering that are of relevance to the glass industry.

*Massachusetts Institute of Technology's Sloan School of Management on the impact of supply-chain visibility on trust and its impact on purchasing decisions by the consumer. The key message of that study is "The increase in trust due to greater visibility accounts for a 3.3 percentage-point increase in sales".

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FIERA MILANO

Laser upgrades: Adding value to standard products

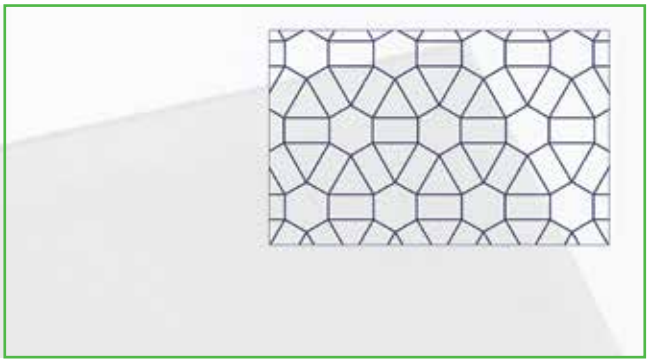
Adding value to standard products: The Laserbird adds extra functionality to standard products, thus offering potential for new target markets and higher profit margins.

Thanks to laser technology, the glass industry can do something that would be almost inconceivable in any other sector. Laser finishing treatment enables manufacturers to enhance the value of largely standardised products and increase their functionality. With prices for traditional IG units and facade cladding coming under increasing pressure, using laser upgrades to create bird protection glass, RF-transparent glass and anti-bacterial glass gives manufacturers the chance to tap into new target markets and increase their profit margins.

HEGLA boraident of Halle/Saale, Germany, is a company that specialises in these types of laser applications. The HEGLA Laserbird is a system that can manipulate the top layer of a pane of glass or use laser printing to alter its properties, thus providing the glass with an additional benefit for the customer. “The high degree of flexibility and precision that laser technology offers is what sets it apart from other processes. You can switch between different finishing treatments without wasting time retooling, and the system can be used to work on both individual panes and finished IG units,” explains Dr Thomas Rainer, Head of Development at HEGLA boraident.

Bird protection and RF-transparent glass

RF-transparent glass is created by removing a layer of the coating in a dodecagonal pattern with



Full reception in conference rooms and office buildings, thanks to RF-transparent glass with a laser finishing treatment. When part of the existing coating is removed, even 5G waves can penetrate the glass. The texture is imperceptible to the human eye.

extremely thin lines. Once this is done, the interior behind the pane of glass in question will enjoy full data and phone reception – perfect for conference rooms, office buildings and public transport. The pattern is almost invisible, and imperceptible when used as part of a finished IG unit.

Birds can be protected from colliding with glass by lasering a different shape into its coating. For optimum results, Dr Rainer recommends applying the laser to the pyrolytic coating on the outside of the IG unit. However, the glass can also be functionalised without this layer. In such cases, a laser printing process is used to apply a pattern that birds will recognise as an insurmountable obstacle onto the outside of the facade glass. “In Europe alone, 250,000 birds die every day from collisions with glass windows and doors,” the Head of Development reports. “New legal requirements at the international level have opened up a new market for these applications, and the demand for these types of glass in public and commercial buildings is growing in many local markets as well.” The print is weatherproof, scratchproof and lightfast.

Silver ions for an antibacterial effect

An antibacterial effect can be generated using a new, patented finishing treatment that involves embedding silver ions in the surface of a pane of glass. When bacteria and germs come into contact with such a surface, the silver ions reliably kill them off. There are plenty of potential applications for this technology, especially in sectors with strict hygiene requirements, such as hospitals, commercial kitchens and public buildings.

Technical application

The physical conductivity of the top glass layers also makes them suitable for technical applications. For example, the low-E layer can be textured in such a way that it creates conductor circuits. This technique can be used to slightly heat up the glass panes in cooling units to prevent them fogging up. This technology is especially popular in conservatories in cold countries, which need to be protected from excessive snow loads. Conductive glass can also be used for burglary protection systems, triggering an alarm if the glass is damaged or broken.

Gentle decoating in a top-quality process

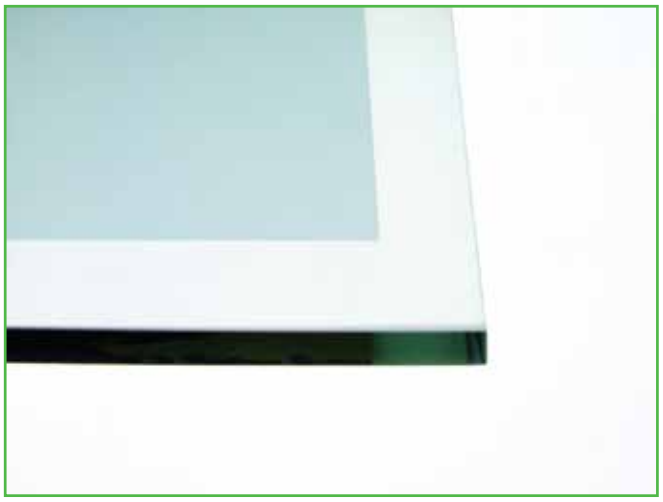
Whether you want to perform edge decoating or partial coating removal to create lighting effects, laser technology makes the process gentle and precise. “The lasered area is crystal-clear and free of scratches, which means this form of decoating produces perfect results even for the high standards of structural glazing and visible areas in general,” the Head of Development and authorised signatory for the company explains. The surface of the glass remains completely intact, as do its dazzling looks.

App control and automation

The Laserbird’s various finishing treatment programs can be selected via an app-based

With silver ions embedded in the glass using laser technology, germs and bacteria have no chance of survival. Suitable for application in any environment where hygiene is of the utmost importance.

control system. The lasering jobs can be created in advance using the work preparation software in your office, then you can save them in your ERP system or directly in the Laserbird system itself. Once the job has been selected, the glass is automatically transported into the system and the lasering begins. The Laserbird system can also be integrated into your ERP system for full data access, or you can use glass markings and an automated scanner to create a localised control system – thus making the experience even more user-friendly. As soon as the pane of glass or IG unit is available, the system scans the marking and the finishing treatment is activated. If your Laserbird is fitted with this scanner-based control system, the glass can be loaded onto it from a rack or harp rack in any order. Alternatively, it can also be connected directly via an AGV, for example. “The best place to position the Laserbird is at the end of your production line, as a stand-alone process station,” Dr Rainer recommends. “This keeps the finishing treatment separate from the glass flow, so it can be optimised to suit the process and delivery deadlines at hand.”



Gentle edge decoating with the Laserbird creates crystal-clear, aesthetically pleasing results that are bound to leave an impression, even in the visible areas.

A new era in secrecy with double-sided glass | Yorglass

Feel the privilege of double-sided glass in decoration

We have been using glass products for hundreds of years in all areas of our lives Glass meets all our needs, isolation to light needs, from a stylish design to create a private space.

Glass products are affected by technology and trends in their thousands of years of history. They are helping us make a difference in the design of our houses and offices today.

Double-Sided Glass designed by Yorglass is for different areas such as cafes, offices, and bathrooms. They add aesthetics to the spaces.

Turkey's first manufacturer of satin and decorative glass Yorglass designs Double Sided Glass to bring together the venues with glamorous patterns for an aesthetic stance in private living spaces. Double-Sided Glass patterns such as Snow, Spider, Illisuion, Rope and Zigzag are produced for those who are bored from the numbness of concrete and metal.

Glass products are keeping elegance at the center of life with aesthetic touches in modern spaces. Yorglass Double-Sided Glass offers a wide range of use in different areas for creating private space, natural light distribution, and adding depth. They can be used on decorative surfaces, glass walls, partitions, stairs, balustrades, office, shower and bathroom cabinets, interior and exterior doors. Also can be produced in special patterns according to the customer’s request.

Please contact us for more with the details of your project. All designs can be produced as cut to size and finished as tempered. Standard sheet size is 3210x2250mm. (or 88x126”).

Contact address
marketing@yorglass.com

United Nations approves 2022 as the International Year of Glass

The International Commission on Glass (ICG), the Community of Glass Associations (CGA) and ICOM- Glass are promoting 2022 as a United Nations International Year of Glass to underline its scientific, economic and cultural roles and celebrate several anniversaries.

This exciting journey began in 2018. Support came from 1750 Universities and research centers, societies and associations, museums, artists, educators, manufacturers and companies in 83 countries on 5 continents. Having successfully negotiated the disruption caused by a pandemic, a draft Resolution outlining our ambitions was negotiated with the Missions of several UN countries during April and passed the silent process on 11th May. The formal resolution was agreed at the United Nations General Assembly on May 18, 2021.

We have begun the task of diffusion and coordination of thousands of activities across the planet: congresses and seminars, industrial fairs and glass schools will coexist with artistic exhibitions, books, social media, scientific, technical and general interest magazines. Event planning will rely on grass roots input and a network of volunteers; delegation will be indispensable. National organizations will focus on advertising, sharing best practice and providing a supportive environment. A Council, based on representatives who can coordinate effectively with national institutions, will promote the best ideas and multiply their impact; moreover, national and regional Steering Committees will act supporting this coordination.

The internet, underpinned by glass fibre cables, and viewed through glass screens will support communication. We are designing a framework to record, develop and share ideas across the glass world based on our web site (www.iyog2022.org) and a LinkedIn group International Year of Glass 2022 exists.

Currently agreed are an Opening Conference in Geneva (10-11 February 2022), an ICG Congress in Berlin, the Glass Expo in China with satellite events, plus Art/History Congresses in Egypt, the US and Europe. Dedicated issues of international journals will be printed, exhibitions are planned in museums, public and private glass collections, and educational materials are being prepared for universal dissemination.

The Spanish Research Council, CSIC, is committed to publishing a celebratory book and organizing exhibitions on: a) IYOG objectives and b) creating a Circular Economy based on recycling and glass containers. English and Spanish versions of exhibition materials will be offered to all supporting countries with translation possible.

Another task is fundraising, particularly to finance the opening event in Geneva. A team is poised for action.

A major issue is dissemination of ideas and activities and thus the magazines, printed and electronic versions of all type of publications related to glass are indispensable. So I am writing to invite you all to join our project and work side by side to announce and promote activities and events all along the planet. If you are not registered please do it in our website www.iyog2022,org and you will be contacted to take part in this common work.

IYOG2022 is a dream come true, one we scarcely dared to anticipate. We are moved by the joy of dreams fulfilled, prepared for challenges ahead and limited only by our imaginations.

Alicia Durán
Research Professor CSIC President of the ICG
Chair of IYOG2022

Duralux Water Based: New Line Of Fenzi Mirror-Backing Paints Offers Quality, Ecology and Durability

The Fenzi Group's approach to low-environmental-impact products and those with reduced VOCs (volatile organic compounds) also extends to the mirror production business unit. The most recent frontier in terms of mirror-backing paints is the new line of latest-generation Fenzi products capable of contributing to the production of high-quality, eco-friendly mirrors with outstanding reflective, safety and chemical resistance properties.

Using a water base, the Fenzi Group labs developed Duralux Water Based, a complete range of lead-free, glass-silvering mirror-backing paints with extremely low VOC emissions - chemical agents potentially harmful to health and the environment. This is a major innovation for mirror manufacturers, processors, end users and the environment.

Since 1941, Fenzi has pioneered new solutions in mirror manufacturing, keeping pace with and often anticipating changes in the industry. It happened at the outset of this glass industry business adventure, when mirrors were made with a single or double-layer of silver/copper backing paint; and, in the 1960s when the first aluminum-based mirrors appeared and Fenzi developed new mirror-backing paints to lend superior properties to this new type of mirror. In the 1970s Fenzi developed new paints based on thermosetting resin technology, which brought a significant improvement in mirror durability. The breakthroughs continued in the 1990s with copper-free technology and development of painting systems that were compatible with this new substrate, a technique that then proved useful in removing lead from the paint, making mirrors much more eco-friendly. By specifically focusing on reducing the environmental impact of mirrors and the products used in their production, in the 2000s Fenzi achieved a leadership role in developing mirror-backing paints with ever-lower levels of VOCs and, they were formaldehyde-free. The company then launched formulations with extremely low VOC content and extraordinarily good chemical and mechanical properties – the best the market has to offer. Still today, Fenzi enjoys this leadership position, with first-rate manufacturing plants in Italy, Belgium and China and an R&D team and state-of-the-art laboratories for advanced research in the field of mirror products. In fact, Duralux Water Based was developed at the mirror business unit's expertise center.

Compared to the other commercially available mirror-backing paints, the special Duralux Water Based formulation makes unique performance possible - including a VOC level five-times lower than the market standard, the use of solvents with reduced environmental impact, extraordinary chemical resistance and greater product durability. This is a one-coat, user-friendly painting system, convenient for curtain or spray application, completely lead-free, perfect for use on copper-free mirrors, and it can be applied on most existing mirror lines that use traditional solvent-based paints.

The Duralux line ensures a tried and true, high-performance product, one that is always updated. In 80 years of business, the Group has become a global leader in glass-processing chemicals, offering a complete range of products and setting the standard for the entire glass industry. Thanks to its considerable innovative prowess, based on know-how acquired in so many years in this market and on research and development activities consistently focused on customer needs, the Group has created a complete, always cutting-edge product range, positioning itself as the preferred partner for mirror manufacturers around the world.

Leading Fabricator, GlasPro, Adds Diamon-Fusion® Protective Coating to Glass Products

GlasPro offers Diamon-Fusion® easy-clean coating on their glass railings, canopies, and storefronts, protecting them against stains and corrosion.

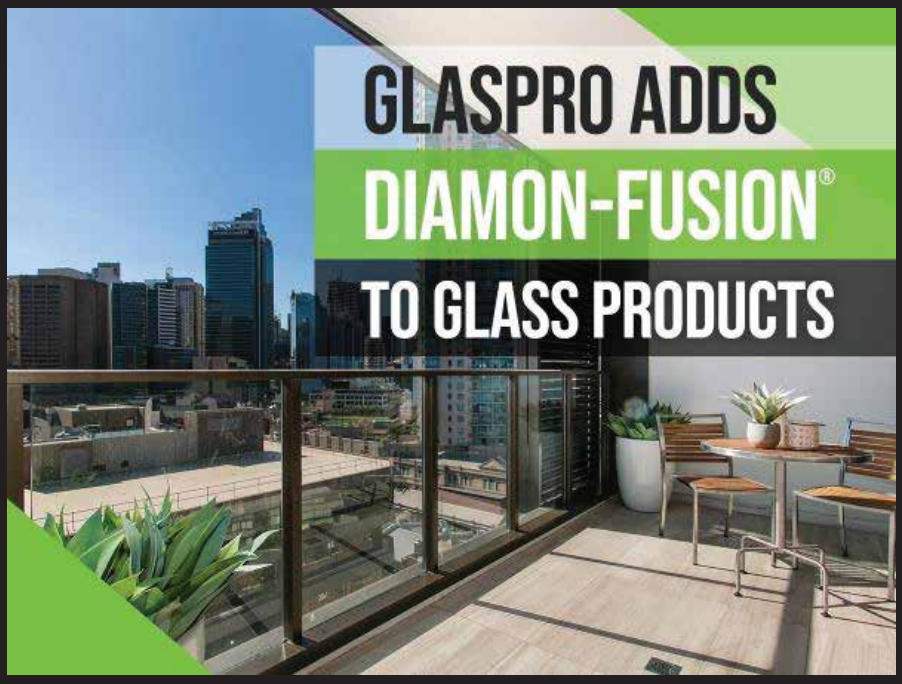
Today, Diamon-Fusion International (DFI) announced that Glaspro has chosen Diamon-Fusion® protective coating to bring additional value on their commercial glass offerings. The Company went with DFI's patented protective coating to offer a superior product to their customers, which also comes with an industry-leading warranty, unparalleled customer service, and can be applied to a wide range of glass surfaces including acid-etched glass, sandblasted glass, textured glass and much more – satisfying a diverse set of clients.

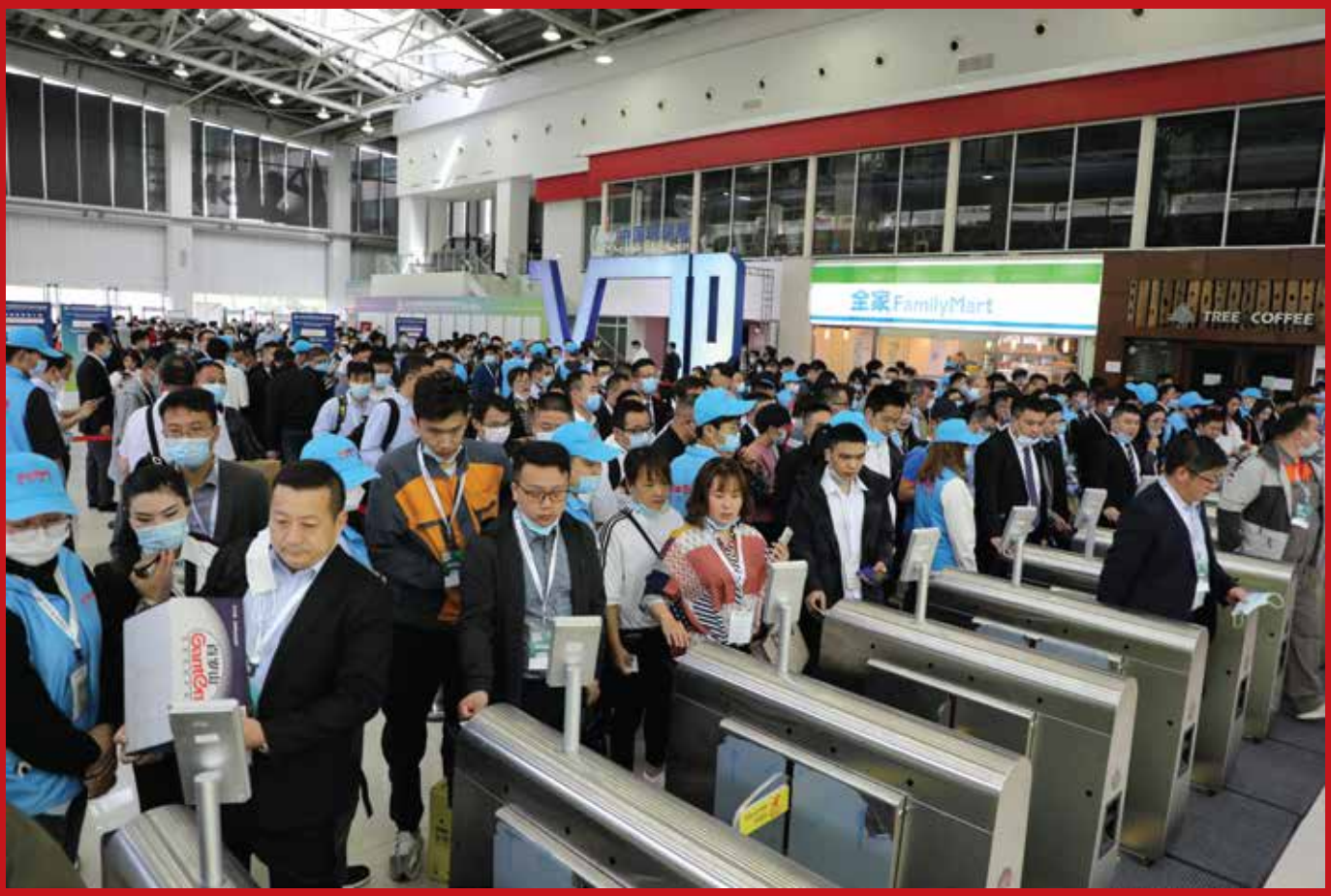
Located in Santa Fe Springs, California, GlasPro's 75,000 square-foot facility houses complete tempering, lamination, and fabrication operations all under one roof. They will offer Diamon-Fusion® on commercial glass railings, canopies, interior glass, IGU's, and storefronts. For more than 25 years, the company has worked within the commercial market, and adding Diamon-Fusion® to their product line will continue the Company's mission of offering quality products backed by a trusted name.

"Our company is focused on overall quality, on-time delivery, and customer service. When looking at a new product offering, we wanted to go with a company that could help differentiate our business and partner with us to bring something new to our customers. Going with Diamon-Fusion® was an easy decision since many of the largest glass fabricators trust Diamon-Fusion® for their protective coating needs." – Ed Lemley, VP of Manufacturing, GlasPro

"We thank Joe, Ed, and their team for partnering with DFI and trusting in Diamon-Fusion® protective coating. As excited as we are, our job here is just starting. Their success is our new initiative, and we plan on helping them get there." – Syndi Sim, VP of Marketing and Business Development, DFI

Founded in 1988, GlasPro is a trusted fabricator of architectural, structural, and decorative glass for discerning architects, designers, and glaziers. Their mission is to deliver on the on their customers' visions with exceptional products and outstanding personalized customer experiences.





The 31st China Glass Exhibition has come to a successful conclusion

On May 9, organized by the Chinese Ceramic Society, the 31st China International Glass Industrial Technical Exhibition has come to a successful conclusion in Shanghai. On the key time of the first year of China's 14th Five-Year Plan and building a new development pattern and promoting the development of high quality of China glass industry, The 31st China Glass Exhibition successfully held despite the impact of the Covid-19 pandemic and many uncertainties, bringing new opportunities to the entire industry and demonstrating confidence and vitality to the global glass industry. As the first global exhibition of glass industry held under the normalization of epidemic prevention and control, China Glass helps the technological innovation and trade circulation of the industry and serves the national strategy by its exhibition functions, and provides more opportunities for domestic circulation of the glass industry, and promotes international and domestic double circulation and international cooperation, and contributes China's strength to the recovery and growth of the global glass industry.

Extra-large scale: the industry's preferred exhibition platform

A total of 900 manufacturers from 23 countries and regions participated in the exhibition, with an exhibition area of 90,000 square meters. According to the statistics, the professional visitors to the exhibition reached 40,826 person times, which strongly proved that China Glass is the first choice platform for domestic and foreign industry manufacturers to expand trade and technical exchanges.

The exhibition products cover the whole industry chain of the glass industry including: glass production, new energy glass and TFT glass, glass fusion molding technology and equipment, high-quality refractory materials, glass raw materials and complexes preparation technology and equipment, glass deep processing technology and equipment, energy saving and

environmental protection glass technology and equipment. The exhibition used 7 halls in SNIEC Expo Centre. Among the halls, the international area located in hall N1 where gathering the German and Italian national pavilions and many mainstream brands in the global glass industry, hall N2 is the area of flat glass manufacturers and large comprehensive glass equipment manufacturers, Hall N3, Hall N5 and Hall W5 is area of glass production and deep processing equipment manufacturers. Hall W4 is an exhibition area for small and medium-sized enterprises who involve in daily glass, decorative glass, abrasives, accessories, hardware, accessories and other fields.

Communication and sharing: witness the new trend of industry development

Many distinguished guests at home and abroad were present at the event, including Mr. Yan Xiaofeng, Secretary of the party committee of China Building Materials Federation, Mrs. Gao Ruiping, President of the Chinese Ceramic Society, Mr. Xu Yongmo, Chief Supervisor of the Chinese Ceramic Society, Mr. Peng Shou, Academician of Chinese Academy of Engineering, Vice President of the Chinese Ceramic Society and Chairman of Triumph Group, Mr. Zhang Lianmeng, Academician of Chinese Academy of Engineering, Mr. Chen Guoqing, Vice Secretary of the party committee and Vice President of China Building Materials Federation, Mr. Jin Zhanping, Vice President of the Chinese Ceramic Society, Mr. Song Lixin, Vice President of the Chinese Ceramic Society and Director of Shanghai Institute of Ceramics, Chinese Academy of Sciences, Mr. Wang Yimin, Secretary of the Party Committee and Chairman of China Building Materials Academy, Mr. Tan Fu, Secretary-General of Chinese Ceramic Society, Mr. Zhang Baiheng, President of China Architectural and Industrial Glass Association and Heads of governments, trade promotion agencies, industry organizations and representatives of manufacturers from Germany, Italy and other countries.

In the period of China Glass 2021, a series of professional technical seminars and manufacturer's promotion activities was held simultaneously, their themes cover the glass deep processing new technology equipment, sintered refractories, special glass, new silicon based materials, production and research of photochromic glass, borosilicate glass in medicinal use. The event shows the new industry development structure and the achievement of high quality industry development, which built by glass industry colleagues by technological breakthrough and by driving of technological innovation.

Focus on Innovation: Smart manufacturing leads green development

Compared with previous exhibitions, the 31st China Glass exhibition features green, low energy consumption, digitalization and intelligent manufacturing. A large number of related fields of products were showed on the event stage. Ultra-white glass, ultra-thin glass, flexible glass and so on, which are used in photovoltaic industry and intelligent terminal field, have become a major technical highlight of this exhibition. Triumph Group showed the world's advanced 30 micron flexible foldable glass, 0.12mm thin electronic touch glass and high quality 5.0 neutral borosilicate medical glass for vaccine. China Building Materials Academy brought key materials for fingerprint recognition under the smartphone screen, and Southern Glass Group showed the latest generation of high-end touch display lithium-aluminum silicate glass cover plate developed using float process.

Energy-efficient and carbon reduction in building industry is a critical piece for China to achieve the goal of peak carbon emissions and carbon neutrality. Many exhibitors in China Glass of this year brought its cutting-edge productions and equipment. The representative manufactures of vacuum glass field including: China Building Materials Academy, Landglass, Beijing MGM Glass and Beijing Mingxu Vacuum Glass. The representative manufactures of PDLC Glass field including: Shanghai SYP Glass, Gauzy. The representative manufactures of insulating glass sealing material warm edge spacer field including: Koemmerling, LiSEC, Glaston, Quanex, SWISSPACER, Technoform.

Intelligent and digitalization has become the tendency of development of Glass deep processing equipment. The conception of smart factory, efficient production, unmanned has been embodied in several manufactures' latest equipment of this exhibition. Northglass introduced its upgraded high-stress glass tempering furnace, glass automation

coating line, sinestcellular curtain, tri-turbo fan and coating cathode, etc. Jinglass brought its deep processing intelligent coating line and VULCAN HUOSHAN MES intelligent tempering equipment. Landglass showcased for its self-developed fire resistant glass tempering machine, IriClearTM glass tempering furnace series, as well as Land Glass TIGERTM Smart Factory and the data comparison. Yinrui introduced “Sanda software” which is specially tailor made for glass deep-processing equipment manufacturers. Liaoning North Glass brought its latest self-developed fully automatic unmanned assembling machine. Hanjiang Automation demonstrated a fully automatic insulating glass production line that automatically stows super spacer strips by robots. Kamrola showed the development and application of industrial quartz ceramics in glass deep processing and other intelligent manufacturing fields. South Glass showcased for its S-Cloud industrial internet platforms which are applied to tempering field, temperature self-following system and 5mm high borosilicate 4.0 glass pure fan among fire-resistant glass field. The representative manufacture in grinding and polishing field, Guilin Champion Union showed its grinding tools patented product series. The representative manufacture among glasswork field, Fenghe Glass showed its patented product of antioxidant nanometer tempered mirror and dazzle color glass. In addition, this exhibition set up artistic glass display area at Hall 2, dozens of brilliant and dazzling glass artworks attracted numerous viewers to see and take picture.

As the largest professional exhibition in the global glass industry in 2021, China Glass Expo has always been adhering to the concept of large-scale, international and professional exhibition, overcoming the double pressure of the industry downturn and the impact of the epidemic, and offering a wonderful and fruitful trade and technical exchange event for the industry. As the theme activity of 2022 UN International Year of Glass, China Glass 2022 will be held at Shanghai on April 13th. The global glass industry will again focus on Shanghai and we look forward to meeting again with every industry colleagues.

Beijing Zhonggui Exhibition Co., Ltd.

EME starts turn-key job at HEINZ-GLAS Dzialdowo in Poland

After receiving the order for a cullet preparation and batch transport system from HEINZ-GLAS end of last year, EME recently has started with the installation of the building and equipment in Dzialdowo.

The supplies and services are executed on a turn-key basis and include the complete hot and cold end factory cullet system, as well as the feeding and storage of external post-consumer recycled glass.

Active shooter response training offered as part of the FGIA Hybrid Fall Conference

Participants at the FGIA 2021 Hybrid Fall Conference will have the opportunity to take part in safety sessions focused on preparing for and disarming active shooters, led by Donny Hawkins and Mike Britt of Sentinel Security Group LLC.

Participants at the Fenestration and Glazing Industry Alliance (FGIA) 2021 Hybrid Fall Conference (October 18-21) will have the opportunity to take part in safety sessions focused on preparing for and disarming active shooters, led by Donny Hawkins and Mike Britt of Sentinel Security Group LLC. Both trainers provide security consulting, education and training to help organizations protect their teams.

Committed to encouraging team solution training through on-site security evaluations, tabletop incidents, and review of past and current situations, Hawkins and Britt will teach how to effectively stop a threat from harming others. Two sessions will be offered: an across-the-board session for both in-person and virtual event participants and a hands-on session exclusively for in-person participants at the conference in Phoenix, AZ.

"As a safety professional, I have been actively involved in threats against our team, and the solutions, techniques and expertise offered by Sentinel is simply some of the best I have ever seen. I recommend this training to any company who is struggling with how to deal with this very real threat and am proud to have Sentinel as a resource to help keep our team safe," said Mike Troutman, Vice President of Environmental Health and Safety Excellence for MI Windows and Doors and Co-Chair of the FGIA Fenestration Safety Committee.

Sentinel Security Group continues to evolve in their training methods and learn from events occurring worldwide, while being flexible enough to meet specific crisis management needs. These sessions on mitigating risks from active shooters are sponsored by the FGIA Fenestration Safety Committee. Space is limited, and a participation form is required for the hands-on session.

Preparing for Active Shooters and Preventing Mass Casualties I When to Run, Hide or Fight
This across-the-board session will take place Wednesday, October 20, and will consist of a presentation, lecture, discussion and demonstrations. The one-hour presentation will cover:
•The problems with run, hide, fight and mitigation factors
•Run, hide, fight concept in-depth
•Run, hide, fight interactive scenarios
•Survivor mindset (mental preparation and mental practice)
•Characteristics and signs of an active shooter
•Physical security mitigating factors
Disarming Active Shooters and Responding to Mass Casualties I Hand-to-Hand Takedown Tactics

This hands-on session will be presented twice: once on Wednesday and again on Thursday, October 21, and is available exclusively to in-person conference attendees. Participants should wear loose fitting clothing and remove all jewelry and disclose any existing injuries prior to class. The one-hour hands-on session will cover:
•Tactical considerations for warehouse, office and public areas
•Basic active shooter defensive tactics
•Active shooter exercise (run, hide, fight)
•Team takedown exercise
•Control holds
•Weapons familiarization training
•Weapons disarming (pistol, knife, rifle)
"The services offered by Sentinel Security are sorely needed in this turbulent time as we confront frustrated individuals who believe violence is the only solution," said Troutman. "It is our duty to protect our team, and Sentinel Security continues to support that mission by giving us the tools needed to confront this threat, not only at work, but in our personal lives. Sentinel has been instrumental in organizing and preparing us for the unexpected and forcing our team to plan, involve, commit and react as threatening incidents develop and to recognize and defuse potentially dangerous situations."

For more information about FGIA and its activities, visit ***FGIAonline.org***.

2021 GIMAV ASSEMBLY:

2020 INDUSTRY DATA PRESENTED ALONG WITH 2021 FORECASTS. BOARD OF ARBITRATORS AND SOLE AUDITOR ELECTED.

Data presented at the meeting reflected the impact of the COVID-19 pandemic on performance of the glass processing industry which, however, has managed to bounce back; getting 2021 off to a good start raises hopes for at least a partial recovery. During the meeting, the Board of Arbitrators and Sole Auditor were appointed for the 2021 - 2025 term.

INDUSTRY PERFORMANCE IN 2020

Production down 16.6% due to a drop in exports (-14.9%) and in domestic sales (-20.7%). This is how the pandemic negatively affected the performance of Italy's Industry of Manufacturers of Glass Processing Machinery and Technologies that closed 2020 with overall sales of 2,027 million Euro.

Imports also fell (-11.1%), causing the domestic market to shrink (-17.2%). There was an overall drop in trade (-14.2%) as well as in the trade balance (-16.1%) which, however, remained very positive at nearly 1,080 million Euro.

If 2020 was the year of global economic crisis, Italy's glass industry companies fought back with extraordinary buoyancy and resilience, as seen in the competitiveness indicators that position the industry among Italy's domestic excellences. In fact, the ability to penetrate international markets increased, with a 71.5% export share of sales, while sales on the domestic market held at 60.9%, a minimal drop justified by the strong restrictive measures adopted to limit the effects of the pandemic.

"Our industry was really put to the test by 2020," stated GIMAV President, Michele Gusti. "Despite the pandemic that swept in waves across our sector and the ensuing lockdowns and border closures, the manufacturers of Glass Processing Machinery and Technologies acted swiftly to limit their losses, more successfully than their international competitors."

Flat Glass Processing Technologies were the worst hit by the pandemic with lower revenues, exports and domestic sales for all of 2020, compared to 2019 (except for November sales). Nonetheless, there was better international market penetration and a firmer foothold in the domestic market was established.

Overall better results for Hollow Glass Processing Technologies which, in 2020, limited sales losses to -8.9%, thanks to the positive performance of domestic sales (+17.7%). This owes much to the fact that the Hollow Glass Industry could keep working – notwithstanding the restrictions to limit the effects of the pandemic – being part of the supply chain considered strategic to national interests. This helped balance out the 15% drop in exports. The sector improved its own domestic market presence, but experienced a drop in international competitiveness.

The Accessories and Other Glass Processing Technologies sector limited its losses in revenues, exports and domestic sales to 10%. The sector's international competitiveness remained fairly stable, which improved its foothold in the domestic market.

THE "2020 EFFECT"

Analyses by the GIMAV Study Center of the early effects of the global pandemic became available in March, when the Glass Processing Machines and Technologies industry suffered a 2.9% drop in revenue, compared to the previous month, rather than the expected seasonal growth (+29.5% in 2019).

The catastrophic effects of the crisis were even more apparent in April when the emergency measures adopted by the authorities on the heels of the so-called "first wave", brought normal business activities to a standstill, with the resulting crash (compared to April 2019) in exports (-57.3%), domestic sales (-45.6%) and thus, overall revenues (-53.6%).

Thanks in part to the first re-openings, the next two months were marked by a “technology rebound” which began to narrow the gap, until November. That’s when, aside from the “lost ground” of previous months, for the first time in absolute value, revenue outpaced that of 2019. Nonetheless, the arrival of the so-called "second wave" in December curbed the recovery, perhaps concealing the truly positive factor, that is – the ability of the industry’s business fabric to react to and withstand extremely unfavorable circumstances for the domestic economy and, even more, for international trade.

The macro-family of Flat Glass Processing Technologies was, without doubt, the hardest hit by the effects of the pandemic – exports suffered the effects of the obstacles to shipping merchandise and in international travel, and domestic sales were handicapped by measures adopted to limit the effects of the pandemic. Revenues fell below 2019 levels throughout 2020, highlighting how the sector was more severely damaged by the “second wave”.

Performance of the Accessories and Other Glass Processing Technologies sector was much the same as that in the first part of the year. In August, however, very similar figures to those of the previous year were recorded and November and December rose higher than in 2019, proof that, in this case, the sector was not affected by the so-called second wave.

From March to August, the Hollow Glass sector was also severely affected by the slump in international demand. Starting in September, exports regained their usual momentum and revenues remained firm at values higher than those of the previous year. Thanks, in part, to the ongoing contribution provided by domestic sales in meeting demand from the food and pharmaceutical industries, the industry also succeeded in riding-out the “second wave” of the pandemic.

2021 FORECAST

By January 2021, the negative December 2020 performance had already subsided, paving the way for recovery in February, thanks to good domestic sales and a partial resurgence in exports, that stabilized in March as exports fully resumed.

Projecting first quarter results to December 2021 - without taking into consideration any changes that could occur by year-end to positively or negatively affect industry businesses - revenues are expected to grow by 4.5%. This is still a modest result, fueled by good performance from the Accessories and Other Glass Processing Technologies industry, by substantial stability in the Flat Glass sector, compared to 2020, and by negative results for Hollow Glass, due to exports that remain stagnant.

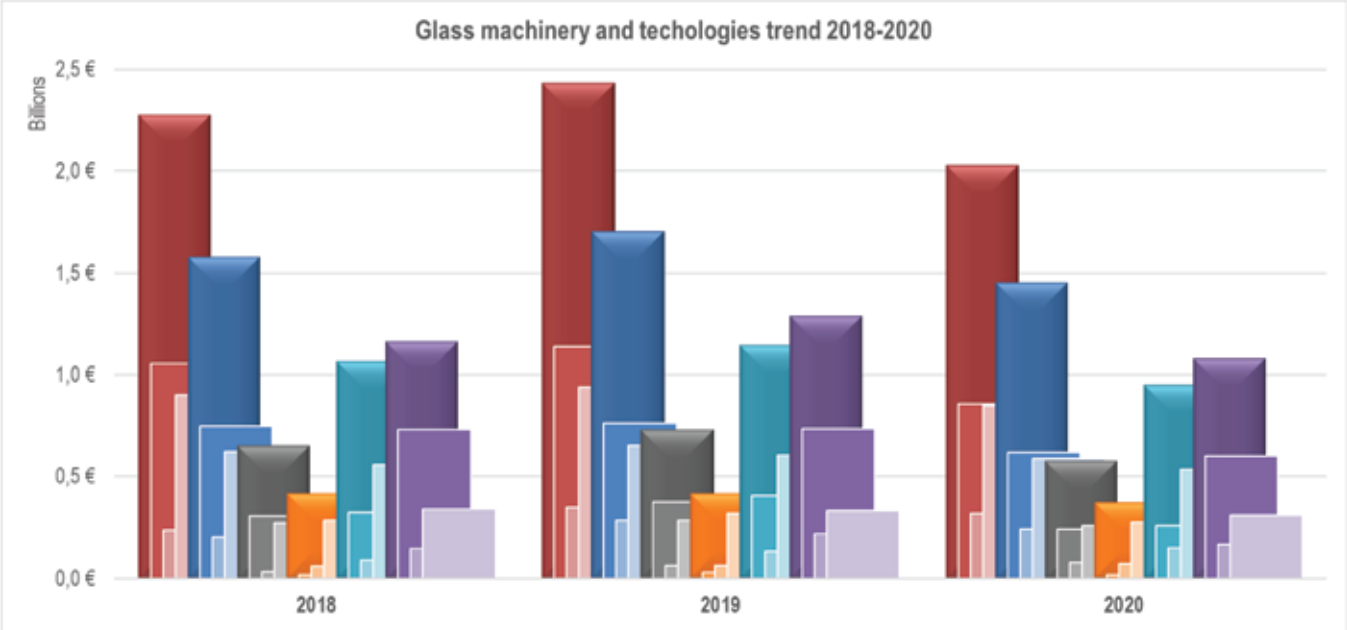
Bearing in mind, however, that the forecast does not take into account second quarter results - still unavailable, and during which time the international scenario has partially normalized, thanks to the strengthening of the Covid-19 vaccination campaign - and, in fact only includes the results of a period still conditioned by the so-called “second wave”. It can be reasonably assumed, therefore, that the 2021 results could be better than forecast and, given the reduction in infections and the vaccination drive continuing at full speed, they could possibly come close to 2019 levels, as clarified by GIMAV Director Fabrizio Cattaneo: "The data say it all: 2020 was a tough year for everyone, including the Manufacturers of Glass Processing Machinery and Technologies. However, given the encouraging first-quarter figures, our industry can look to 2021 with optimism. Basing our forecast on the little data available, we have predicted moderate growth expectations but we are well aware that a major underestimation is inherent to the method. Nevertheless, taking into account the unprecedented times we are living in and that we have not entirely put behind us, it seemed more judicious to propose an approximate ‘rounded down’ estimate that could possibly be reviewed as things improve in the future, rather than making a more optimistic forecast and then having to adjust it downward.”

The trend toward a definite recovery is also confirmed by the optimism surrounding VITRUM 2021 - the numbers for the next edition are positive. “We said it during the pandemic and we reiterate: VITRUM 2021 will be the industry’s recovery trade show, not only for manufacturers but also for those who use Glass Processing Machinery, with a special focus on end users through the concurrent GLASS WEEK events,” remarked Dino Zandonella Necca, President of VITRUM and of the Glass Processing Accessories and

Other Technologies section. "From October 5th to 8th, Milan will be the stage upon which every aspect of glass will be projected and we are working hard to make it a great event for everyone!"

BOARD OF ARBITRATORS AND SOLE AUDITOR APPOINTED

During the GIMAV General Assembly, following approval of the statutory changes needed to provide the Association with suitable tools appropriate to a modern system of business representation, the Arbitrators

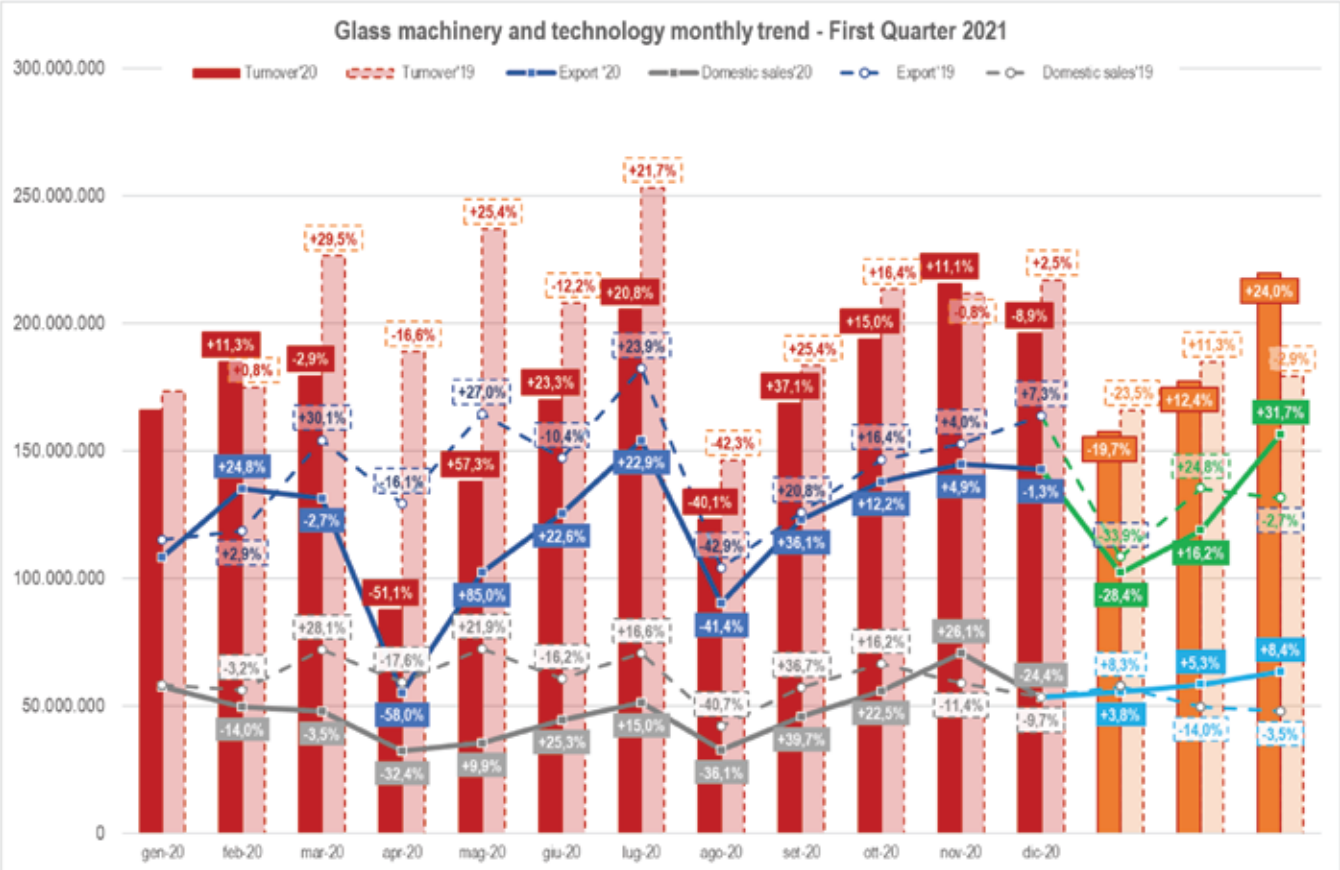


	2018	2019	2020	19/18	20/19
Turnover	2.275.595.940,33	2.431.912.592,14	2.027.075.874,85	+6,9%	-16,6%
flat	1.086.629.540,49	1.140.281.622,86	857.927.767,47	+4,9%	-24,8%
hollow	250.230.898,93	350.416.461,32	319.185.266,91	+40,0%	-8,9%
accessories and other tech.	938.735.500,90	941.214.507,96	849.962.840,46	+0,3%	-9,7%
Export	1.626.214.045,10	1.704.331.033,65	1.450.308.720,10	+4,8%	-14,9%
flat	757.849.536,30	764.094.206,45	617.897.026,85	+0,8%	-19,1%
hollow	217.742.619,15	284.829.632,70	242.011.855,90	+30,8%	-15,0%
accessories and other tech.	650.621.889,65	655.407.194,50	590.399.837,35	+0,7%	-9,9%
Domestic sales	649.381.895,23	727.581.558,49	576.767.154,75	+12,0%	-20,7%
flat	328.780.004,19	376.187.416,41	240.030.740,62	+14,4%	-36,2%
hollow	32.488.279,78	65.586.828,62	77.173.411,01	+101,9%	+17,7%
accessories and other tech.	288.113.611,25	285.807.313,46	259.563.003,11	-0,8%	-9,2%
Import	415.975.753,20	416.746.073,10	370.363.022,40	+0,2%	-11,1%
flat	24.887.940,00	28.852.530,70	17.645.725,30	+15,9%	-38,8%
hollow	66.377.145,80	66.336.291,00	74.111.308,60	-0,1%	+11,7%
accessories and other tech.	324.710.667,40	321.557.251,40	278.605.988,50	-1,0%	-13,4%
Domestic market	1.065.357.648,43	1.144.327.631,59	947.130.177,15	+7,4%	-17,2%
flat	353.667.944,19	405.039.947,11	257.676.465,92	+14,5%	-36,4%
hollow	98.865.425,58	131.923.119,62	151.284.719,61	+33,4%	+14,7%
accessories and other tech.	612.824.278,65	607.364.564,86	538.168.991,61	-0,9%	-11,4%
Trade balance	1.162.872.834,28	1.287.584.960,55	1.079.945.697,70	+10,7%	-16,1%
flat	732.961.596,30	735.241.675,75	600.251.301,55	+0,3%	-18,4%
hollow	151.365.473,35	218.493.341,70	167.900.547,30	+44,3%	-23,2%
accessories and other tech.	325.911.222,25	333.849.943,10	311.793.848,85	+2,4%	-6,6%
Commercial exchange	2.042.189.798,30	2.121.077.106,75	1.820.671.742,50	+3,9%	-14,2%
flat	782.737.476,30	792.946.737,15	635.542.752,15	+3,3%	-19,9%
hollow	284.119.764,95	351.165.923,70	316.123.164,50	+33,7%	-10,0%
accessories and other tech.	975.332.557,05	976.964.445,90	869.005.825,85	+7,5%	-11,1%

who will make up the Board for the four-year 2021-2025 term were appointed. The appointees are: Adelio Lattuada (ADELIO LATTUADA Srl), Roberta Triulzi (TRIULZI CESARE SPECIAL EQUIPMENT Srl), Sergio Valsecchi (BAVELLONI SpA), Andrea Zafferani (ZAFFERANI GLAS Srl) and attorneys Giuseppe F. Bonacci and Edoardo Tosetto (LEGALI RIUNITI LEX).

At the same time, Clara Alberta Tenconi (STUDIO TENCONI) was elected GIMAV Sole Auditor for the 2021-2025 four-year term.

	2018	2019	2020
E/T	**71,5%**	**70,1%**	**71,5%**
flat	69,7%	67,0%	**72,0%**
hollow	87,0%	81,3%	**75,8%**
accessories and other tech.	69,3%	69,6%	**69,5%**
Ds/Dm	**61,0%**	**63,6%**	**60,9%**
flat	93,0%	92,9%	**93,2%**
hollow	32,9%	49,7%	**51,0%**
accessories and other tech.	47,0%	47,1%	**48,2%**
Tb/Ce	**56,9%**	**60,7%**	**59,3%**
flat	93,6%	92,7%	**94,4%**
hollow	53,3%	62,2%	**53,1%**
accessories and other tech.	33,4%	34,2%	**35,9%**



	Turnover'20	Export '20	Domestic sales'20	Import'20	Domestic market'20	Trade balance'20	Commercial exchange '20
2020	**2.027.075.874,85**	**1.450.308.720,10**	**576.767.154,75**	**370.363.022,40**	**947.130.177,15**	**1.079.945.697,70**	**1.820.671.742,50**
FORECASTS 2021	2.117.981.117,14	1.459.465.573,87	658.515.543,27	412.811.577,66	1.071.327.120,93	1.046.653.996,20	1.872.277.151,53
2020	-16,6%	-14,9%	-20,7%	-11,1%	-17,2%	-16,1%	-14,2%
FORECASTS 2021	+4,5%	+0,6%	+14,2%	+11,5%	+13,1%	-3,1%	+2,8%

Semcoglas on an innovative course with A+W Software

The launch of the digital transformation

More than nine million square meters of safety and performance insulated glass leave Semcoglas's 19 locations each year. This makes the corporate group headquartered in Westerstede one of Germany's leading flat glass finishers. With the investment in the Euroglas float plant in Magdeburg/Osterweddingen, the constant supply of high-quality flat glass is ensured. In 2020, despite pandemic-related restrictions, sales of EUR 260 million were recorded. For 2021, Semcoglas is planning a sales increase of more than 4% and growth of 7% in insulated glass production. In addition to Germany, the Benelux countries are an important target market.

However, outstanding results don't come from size alone. Technology leadership, absolute customer orientation, and the ability to react to new trends and changes in the market at any time are the most important drivers of economic success. One of Semcoglas's biggest challenges currently is the comprehensive digitalization of all locations and areas of the company. This is the only way that performance and efficiency can be increased, so that in the future, Semcoglas can serve its customers with the best on-time delivery and highest product quality at fair prices.

On the way to Industry 4.0

Semcoglas's digitalization partner is the software company A+W, which has been working with the Semco Group for decades. By 2023, all 19 Semco locations will be equipped with the industry solutions A+W Business and A+W Production, including exciting new developments. For product configuration and order processing, Semco relies on online ordering with the A+W iQuote webshop since it speeds up commercial processes for the customer and Semco, eliminates time-consuming entry processes, and enables digital processing of order data via the EDI interface. With such intelligent solutions, Semcoglas will achieve a much higher degree of automation, still greater process stability in its commercial and production-technical areas, and increased efficiency due to the intelligent networking of the entire corporate group.

The future has begun

In early 2019, the project teams from Semcoglas and A+W met for initial workshops in order to set the project, called Momentum, in motion. Meanwhile, the new software has been rolled out successfully in several of the group's plants and we are working full steam ahead on further implementation. Some plants are still working with the preceding versions of the current A+W software; in others, older third-party software had to be replaced with the new systems. "But in no location," explains Semcoglas Project Manager Thomas Graf, "were there severe problems with production after the changeover".

The focus is on the software, but of course there is more. Software and system technology have to be networked to form highly functional production environments; data has to be transmitted to the machines quickly and reliably via intelligent interfaces. Corporate processes will be changed drastically, flows unified group-wide and made more efficient.

Paper and production folders are being replaced by scanners and info terminals. Processes such as internal orders, distribution of orders across the plants, and logistics planning will be revised so that the capacities within the entire Semco Group are used as well as possible. Therefore, with Momentum, customers will profit still more from the strength of

Semco's expert network.

A+W Production Terminal on an insulated glass line in the Westerstede plant: all critical lite information is displayed online and the current processing step is booked online in the database – production is nearly paperless
The Semcoglas community: when will it finally be our turn?
Especially pleasing is that Semcoglas employees are incorporated into the digitalization process, they recognize the benefits, and they are working actively to advance the project. You can see the benefits in the plants that have already been converted; there is no fear of new structures and ways of working. During the project implementation, knowledge was built up with "reference employees" at various plants. This knowledge was then made accessible to other plants in a goal-oriented manner; that is, the employees were deployed flexibly at other locations. This way, Semcoglas benefits from significant synergies within the group and saves time and money

"Meanwhile," says Michel Schüller, Managing Director for Corporate Development and IT, "the project teams from Semco and A+W have grown together into a team that works efficiently toward the goals it sets". Schüller continues, "Thanks to our close relationship and A+W's excellent performance, we feel we are well taken care of, even if things were a little rocky at the start. But that's probably the way things always go in a project of this size.

LAMI production in Nordhorn: the site logistics of the Semcoglas Group enables supply of the insulated glass plants with safety glass without a lot of travel

Completely digital
The Semcoglas management makes a clear distinction between the goals of process digitalization and the digital transformation of the corporate group, which includes the entire Semcoglas ecosystem and will make a significant contribution toward recognizing and fulfilling customer requests still earlier on quickly changing markets.

The biggest challenge, according to Michel Schüller, is people themselves. "Ways of thinking at the entire company," says Schüller, "are becoming more digital, the relationship to customers and suppliers more transparent. This holistic approach will make our business partners stronger and secure the long-term success of Semcoglas on the market".

This also means that IT technology is anchored on the leadership level at the company and it helps shape the company's entire orientation. The goal is a still better digital service culture, with which Semcoglas can set itself apart from its competitors and continue to grow successfully.

Order entry with A+W Business. Orders that are received here via the A+W iQuote webshop are forwarded directly to production via the ERP system.

The Momentum core team – from left: Thomas Graf, Project Manager Semco; Norbert Gardemann, Project Manager A+W; Heiko Schuh, A+W Clarity Director Sales Central Europe; Marcus Lampen, IT Manager Semco

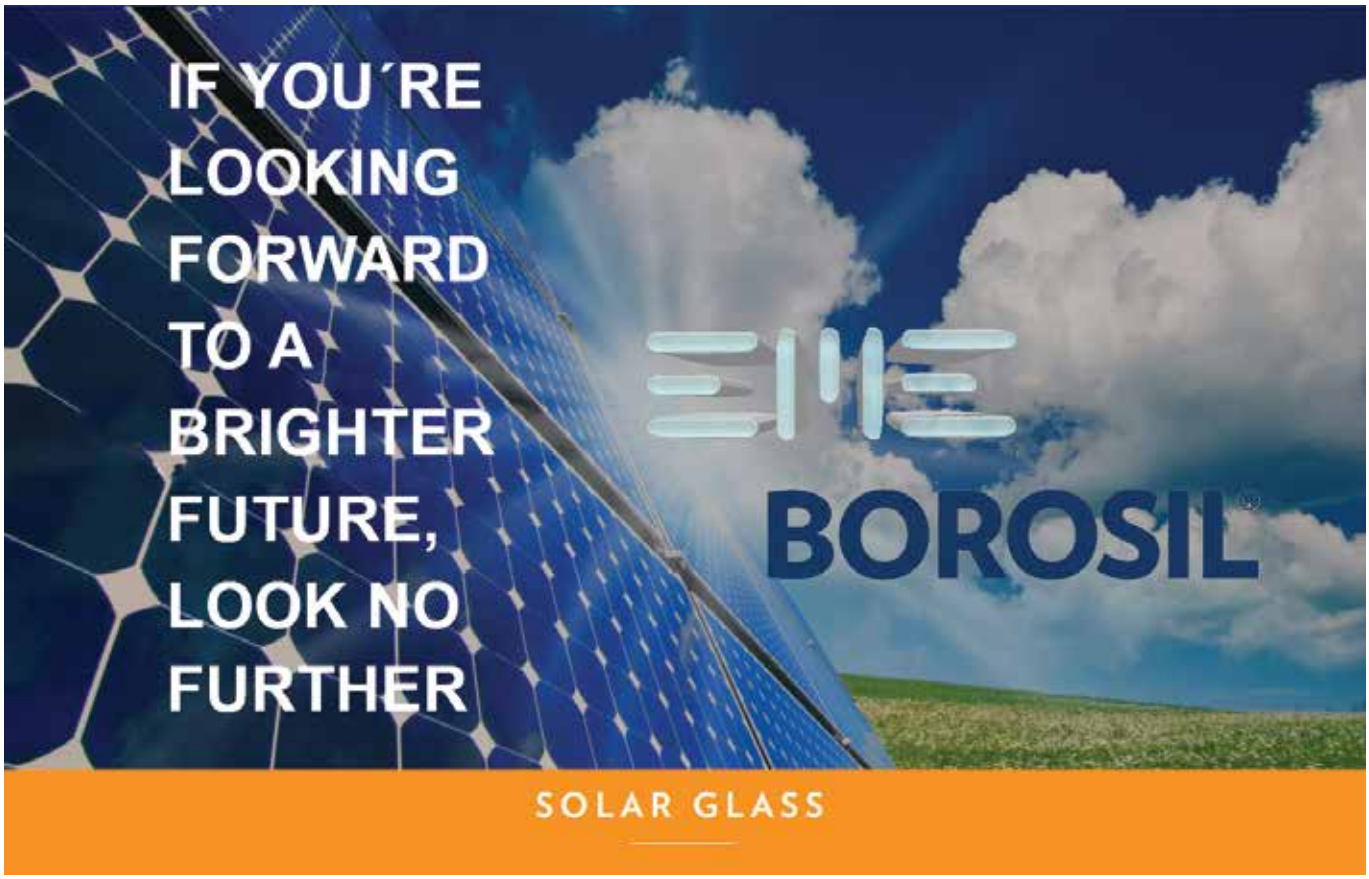
Digital dispatch organization
When an employee assembles a delivery in dispatch at the Westerstede plant, he doesn't need lists or other papers – aside from the barcode label, paper is becoming an endangered species in production and dispatch at Semco. Each package that is ready to send is booked to a unique storage location on receipt in the intelligent high-bay warehouse with a simple reading of the barcode. This is done with the A+W Smart Companion app, which uses smart devices such as handy Zebra scanners instead of traditional industrial scanners

and scans every rack into the production database.

The dispatch information is made available to the plants via the A+W Production Terminal.

Even in the forklift, the employee sees at a glance which rack has to be loaded when on which truck. Searching for lites and racks, as well as other non value-creating work in dispatch is now a thing of the past at Semco in Westerstede. The processes in dispatch are more efficient and faster, and on-time delivery is maximized.

And what happens if something breaks? Broken and defective lites are scanned into the breakage pool with the A+W Smart Companion and remade with the highest priority. Usually it is possible to deliver the unit in question with the same delivery or at least with the following one.



EME technology for Indian solar glass producer Borosil

After a successful upgrade and expansion project in 2019, Borosil Renewables and EME GmbH continue their partnership.

Borosil is expanding its low iron solar glass production capacity with an additional furnace in order to meet increased demand arising from the popularity of photovoltaic panels, flat plate collectors and green building concepts around the world.

EME is designing and supplying the key equipment for the raw material intake, batch plant and cullet return system. The batch plant is specially engineered with future expansion in mind and has the potential to be to the largest batch plant in India.

SOLARBAN glass enhances sustainable design of Swarthmore College buildings

Vitro Architectural Glass products promote daylighting, energy performance for buildings at Swarthmore College

Vitro Architectural Glass and Walker Glass recently teamed up to provide AviProtek-E® bird-safe glass for two new buildings on the campus of Swarthmore College: The Whittier Hall pavilion and The PPR Apartments at Swarthmore.

Heated via geothermal energy, The PPR Apartments at Swarthmore's suite-style living spaces are located near downtown Swarthmore, a short distance from local eateries and shops.

As one of the first projects constructed under Swarthmore College's new sustainability framework standards, AviProtek® E bird-safe glass by Walker glass was combined with Solarban® 67 glass by Vitro Architectural Glass (formerly PPG Glass) to enhance the eco-friendly character of the PPR Apartments.

In a standard 1-inch insulating glass unit (IGU), Solarban 67 glass provides a solar heat gain coefficient (SHGC) of 0.29 and visible light transmittance (VLT) of 54% to deliver abundant daylight while reducing loads for artificial heating and cooling. The glass also provides clear views of the Swarthmore College campus, which further enhances its connection to the community.

Designed for Swarthmore College's art department, the 19,000-square-foot Whittier Hall pavilion features overhead skylights that provide natural lighting for the painting and drawing studios. The building also houses studios designed for sculpture and ceramics work, along with a student workspace and an outdoor sculpture garden.

A signature element of the pavilion is a glass curtainwall that unites bird-friendly AviProtek patterns acid-etched on Solarban® 60 solar control, low-e glass by Vitro Glass. In addition to providing a safer environment for the school's abundant bird population, the curtainwall delivers year-round heating and cooling cost savings. Even finished with Walker Glass's bird-friendly acid-etched patterns, Solarban® 60 glass provides a solar heat gain coefficient (SHGC) of 0.39 while allowing 70% of its visible light to pass through. Whittier Hall also incorporates sunshades to further reduce solar heat gain, a photovoltaic array for electricity generation and a large geothermal well field for heating and cooling.

AviProtek® E bird-safe low-e glass by Walker Glass helps architects and building owners to achieve their environmental goals, earn LEED® credits and meet solar-performance targets. The only bird-safe glass product available with an Environmental Product Declaration (EPD), the product features a selection of patterns that can be applied as horizontal, vertical or decorative visual markers on the first (exterior) surface of clear, Acuity™ low-iron and Starphire Ultra-Clear® glass substrates by Vitro Glass; and with Solarban® 60 glass or Solarban® 70 glass on the second (interior) surface of an IGU.

For additional information about Solarban® 60 and Solarban® 67 glasses and Vitro Glass's full line of architectural glasses, visit www.vitroglazings.com or call 1-855-VTRO-GLS (887-6457).

"Økern Portal" and "The Curve" score with sustainability and aesthetics

Super Spacer® warm edge in two BREEAM-certified properties

Resource-saving materials are increasingly competing with classic reinforced concrete and facades made of primary aluminium. The energy-efficient Super Spacer® Warm Edge spacers have been installed in two showcase projects whose main materials could not be more different, but which have an enormous amount in common when it comes to the circular economy. What's more, they exhibit a very unique aesthetic that harmoniously integrates architecture and nature.

Since January 2021, all new buildings in the EU have to meet the standard of a "lowest energy building" and should cover their energy needs with renewable energies wherever possible. But energy efficiency is only one side of the coin when it comes to sustainable building. On the other side, the discussion about grey energy as well as the circular use of the raw materials and materials used is gaining more and more momentum. It is not only from politics that sustainable construction is receiving tailwind. Tor-Christian Møglebust, partner in the Oslo-based architecture firm DARK Arkitekter, tells us in an interview that the first major tenant of the Økern Portal office complex designed by DARK had explicitly insisted on BREEAM Excellence certification.

Økern Portal with facade made of recycled aluminum

Økern Portal is one of the largest development projects ever realized in Norway. But it is also outstanding because of its striking 14,600 m2 facade made of recycled aluminum. Aluminum producer Hydro's CIRCAL® 75R alloy, made from at least 75 % end-of-life aluminum, has a carbon footprint that is second to none: the guaranteed carbon footprint under 2.3 kg of CO2 per 1 kg of aluminum is 84 % lower than the average for primary extraction and is equivalent to the CO2 released when wood is burned. With WICTEC EL evo from Wicona as the main facade and the Sapa 4150 facade system for the lower two floors, two brands from the Norwegian aluminum specialists are installed in the showcase building.

The client and owner is Oslo Pensjonsforsikring. The complex offers 80,000 m2 of space for offices, a hotel, common areas and a food court. Urban gardening, beehives and a running track are planned on the green roofs. Despite the size, the DARK Arkitekter office has managed to breathe lightness into the design. The building stands on stilts to allow for fluid transitions between the public park and the commercial spaces. The aesthetics of the facade, installed by Staticus, establish a connection with the surrounding nature through the arrangement of its 1,588 trapezoidal aluminum elements. Vertically running bands are reminiscent of tree trunks, while the faceting of the horizontal "leaf elements" creates plays of light and shadow and emphasizes the liveliness of the building envelope. The sophisticated system of solar shading, opaque surfaces and double glazing ensures that the facade meets all regulations and energy efficiency requirements.

Insulating glass on demand on the first two floors

View of the WICTEC EL evo facade from floor 3 and the Sapa 4150 floors 1 and 2

The first two floors, executed by H-fasader with a Sapa standard facade profile, face in six different directions. Glaseksperten A/S from Hjørring, Denmark, therefore customized the total of 3,000 m2 of triple glazing to meet the different requirements in terms of sound insulation, thermal insulation, safety and space utilization. Among other things, insulating glass with varying sound insulation values between 32 and 39 dB was installed. In addition, invisible sound insulation for walls and ceilings ensures that the retail and commercial areas can be used for a wide range of purposes.

"The project was challenging," explains Kent R. Beresford, Sales Manager Norway at Glaseksperten. 12 different glass assemblies were produced in sizes up to 1,200 by 3,000 mm, and the specification for the U-value was 0.6 or less. The outer panes have a highly translucent, color-neutral solar control coating, Sunguard SuperNeutral 70S, while the inside is tempered or laminated glass in various thicknesses. To achieve a thickness of 55 mm for each unit, Super Spacer® T-Spacer™ Premium spacers in widths of 14, 16 or 18 mm were changed accordingly during production in an automated process. "Super Spacer is our preferred warm edge for demanding sustainability projects such as the Økern Portal due to its excellent energy performance. In addition, we always ensure the required precision in spacer application, even under high deadline pressure," adds Glaseksperten Sales Manager Jess Gregersen.

Saint-Denis becomes the secret wood capital of France

When, in the 1960s, the A1 highway cut through the historic royal road that led from Paris to Saint-Denis Cathedral, the industrial city in the north of Paris finally became a banlieue. The royal city, which made history as the cradle of Gothic architecture and the burial place of the French royals, and where the famous Wagon-Lits dining cars were once built, degenerated with the decline of the industrial region into a problem zone with prefabricated housing. But in the shadow of the Stade de France, Saint-Denis is gradually softening the boundaries between the banlieue and Paris. Efforts are being boosted by numerous construction and infrastructure projects for the Olympic Games. Well-known media and service companies have settled here and, according to the city planners, a lively quarter for living and working is being created, which is also developing into a stronghold of French timber construction. For the Olympic Village, which will be built in Saint-Denis by 2024, all buildings under eight stories must be constructed in wood, and taller buildings must at least be designed to be as low-carbon as possible. Thanks to its natural insulating properties, its function as a natural CO2 reservoir and its ease of material recycling, wood from sustainably managed regional forests is an ideal ecological building material. Factory-prefabricated timber frame elements also make timber construction projects increasingly economical compared to classic reinforced concrete construction.

Another sign of the new beginning is the 30-hectare eco-district ZAC de la Montjoie in the city center, where particularly strict specifications apply for the promotion of biodiversity and the use of sustainable materials such as wood. In 2020, BNP Paribas Real Estate implemented one of the largest, large-scale European projects in timber construction here with the 7-story office complex. "The Curve", designed by the Chartier Dalix office, houses around 1,600 workplaces, catering facilities and a fitness center on an area of 24,400 m2. The elegantly curved basic form leaves room for 1,400 m2 of open space, and two green areas planted with trees delimit the building from the street.

5,000 m3 of cross-laminated timber elements from Binderholz form the structure; only the building core and the four basement levels are made of low-carbon concrete. BNP Paribas is more committed to sustainability than almost any other real estate developer. "The Curve" is 40 % below the energy consumption limits of 50 kWh per square meter on average according to the RT2012 thermal insulation regulations and was designed for HQE Exceptional, Effinergie+ and BREEAM certifications. All bidders were invited to submit proposals for the lowest possible carbon materials.

Plane and curved panes form a visual unit

The 10,000 m2 element facade, realized by Metal Yapi, is also part of the sustainable overall concept. In order to flood the offices with as much natural daylight as possible, floor-to-ceiling window areas with windings of between 1,000 and 2,000 mm and a height of 3,285 mm were planned. Saint-Gobain Pietta manufactured the double glazing. In order to find the ideal compromise between comfort, aesthetics and energy efficiency, an extremely transparent and highly selective solar control glass from Saint-Gobain was chosen.

The insulating glass units for the rounded building corners were concavely and convexly curved at Döring Glas in Berlin. The asymmetrical pane structure consists of an outer laminated glass with COOL-LITE® XTREME 70/33 coating on the inside, 16 mm Super Spacer® Triseal™ Premium Plus Black as a warm edge, and an 8 mm float glass.

"We had ourselves certified according to CEKAL especially for this project in order to underline our high quality standards," says Döring Glas project manager Martin Lenz. He continues, "Despite our vast experience, the panes on the first floor and entrance area were a challenge in terms of manufacturing and logistics. The units are up to 3,000 mm wide and 4,102 mm high, weighing in at just under 900 kg. One unit was also screen-printed with a white pattern to provide a barely perceptible visual screen from the outside to the inside. Another requirement from the customer was to precondition each individual insulating glass unit to increase its service life. For each individual insulating glass unit, the pre-calculated pressure was set individually according to the specifications."

Joachim Stoss, Managing Director of Edgetech Europe GmbH and Vice President International Sales at Quanex is proud: "Architecture is currently on an incredibly exciting path. I am confident that together we as an industry will succeed in significantly reducing the carbon footprint of buildings thanks to sustainable materials and consistent circular economy. We are very happy that we at Økern Portal and The Curve were able to make a small contribution again with our Warm Edge."

HFT is proud to announce the hire of Walter Gray as Director of Power Solutions.

Walter's extensive resume brings over 20 years of power industry experience to the HFT team, having worked for E.ON, EcoSecurities, and Centrica. His knowledge has driven successful energy projects across the globe, including projects in the United States, Latin America and Southeast Asia. He has developed both onsite energy solutions and utility scale renewable projects.

Walter's expertise expands HFT's presence in CHP, waste heat recovery, resiliency, and hybrid microgrids. In partnership with HFT's glass experts, Walter will support decarbonization efforts including green hydrogen and electrification in the glass industry. Technology advances in the glass industry and power sector are creating new opportunities to reduce costs while driving energy efficiency.

Walter is currently working with customers in higher power cost regions to deliver cost effective onsite generation from sources including solar, natural gas CHP, and waste heat to power, delivering both economic performance and resilience. HFT is ramping up efforts to improve energy efficiency with waste heat recovery including waste heat power projects which now receives significant investment tax credits. Moving forward HFT will explore more ways to utilize energy storage technologies to support decarbonization by utilizing more renewable energy including wind and solar.

HORN to construct 560 t/d furnace for Bastürk Cam

Baştürk Group with their 45 years of experience in different countries and industrial sectors has established Baştürk Cam Packaging production facility in Turkey in order to contribute to a sustainable and healthy life and to respond product demands in glass sector. In addition to producing jars and bottles from its portfolio, Baştürk Cam is able to quickly respond to the diverse demands of its business partners with the bespoke products. Baştürk Cam glass packaging production facility with its state-of-the-art technology machinery, high energy efficient furnace and high automation system, has become one of the preferred glass packaging manufacturers in the world.

Glass melting technology specialist HORN is to build a 560 t/d end fired furnace for Bastürk Cam at its Malatya plant in Turkey. The new

furnace is designed with six forehearths for the production of container glass. In appliance of the most advanced technology, the furnace will have a melting area of 185.4 m² to produce flint glass. Heating of the furnace will be effected by means of Natural Gas or Back-up Diesel oil burners.

HORN's scope of supply includes the engineering of the refractory and steel structure, the Combustion System, Boosting System, measuring and control equipment, a new HORN HVR® 600F batch charger, supervision of erection, heat-up and commissioning.

Installation is planned to start in the second quarter of 2022.

Glaston updates the strategy and financial targets and announces new non-financial targets

Glaston's Board of Directors has approved a revised strategy with key objectives for 2021–2025.

The key objectives are clearly improved organic growth and profitability, based on Glaston's own strategic initiatives and the expected market growth.

Glaston's addressable glass processing equipment market is expected to grow by more than 5% annually, on average, during the strategy period, and Glaston's ambition is to clearly exceed this market growth. Strategic must-win development initiatives securing net sales growth and improved profitability have been identified in all Glaston's business areas and the services business. These initiatives are supported by Group-wide cornerstone initiatives that target improved commercial and operational excellence.

Glaston's core technologies and lifecycle solutions continue to be at the center of its strategy and Glaston aims to take market share in all its business areas. As the frontrunner in its industry, Glaston plans to increase its investments in innovation and development. Glaston is also continuing its commitment to leading the industry's digital transformation. Profitability improvement is supported by net sales growth, an optimal product offering, as well as productivity improvements.

Along with its strategy, Glaston has set a new vision, which is to 'lead the global glass processing industry forward with innovative technologies and lifecycle solutions'. The company's purpose continues to be 'build a better tomorrow through safer, smarter and more energy-efficient glass solutions'. "This strategy builds on our strengths, which are derived from the combination of Bystronic glass and Glaston. We are focusing on fully utilizing the unique opportunity to leverage our wide range of core glass processing technologies, good customer relationships, experienced people with vast know-how, industry-leading services and a large installed base. Strong global megatrends and clearly growing markets, as well as our business area specific and company-wide initiatives, are driving the growth and give us the confidence to set ambitious financial targets", says Anders Dahlblom, President and CEO of Glaston Corporation.

"Glaston is aiming to take its sustainability ambition to the next level by adding new non-financial targets. These highlight the sustainable nature of our business and the strategic importance of our ESG commitment. I look forward to embarking on this strategic journey together with a fully committed Glaston team", Dahlblom continues.

Financial targets
Glaston's new financial targets for the strategy period 2021–2025 are:
- Annual average net sales growth (CAGR) clearly exceeding the addressable equipment market growth of more than 5% (1
- Comparable operating margin (EBITA) of 10% at the end of the strategy period (2
- Comparable return on capital employed (ROCE) of 16% at the end of the strategy period (3

As glass processing technologies continue to be a fragmented industry, Glaston is maintaining an interest in participating in industry consolidation.

SUSTAINABILITY AS A STRATEGIC FOCUS AREA

As the innovative frontrunner in its industry, Glaston's ambition is to continue being the leader in developing the industry towards a more sustainable future. The majority of Glaston's business is targeted at the architectural customer segment in which the company's products provide key technologies for improving energy efficiency and the safety of buildings.

In its own operations, Glaston is committed to providing a safe and good workplace for its employees, being a responsible partner to its customers, utilizing resources efficiently, and reducing the environmental impact of its production processes. Also, as the demand for more energy-efficient and environmentally sustainable glass solutions is growing strongly, Glaston is continuing to

develop its product portfolio to meet this demand.

New non-financial targets:
Addressing the company's focus on sustainability, in addition to its financial targets, Glaston has set new non-financial strategic targets:
• Customer satisfaction score (Net Promoter Score, NPS) above 40
• Group-wide safety target measured as zero lost time accidents (LTA)
• Employee Engagement target above 75 (out of 100)
• Glaston's CO2 emissions (Scope 1 + 2)(4 in relation to net sales down by 50% from the 2020 level. In 2020, greenhouse gas emissions were 2,777 tons of CO2 with net sales of EUR 170.1 million.

BUSINESS AREA FOCUS ON GROWTH
Glaston will capture growth through its core technologies and lifecycle solutions from the following customer segments: architecture, automotive, display and solar, as well as three regions: the Americas, APAC and EMEA. China is a common focus area throughout Glaston, as it holds the single largest growth potential for all customer segments and Glaston's business areas.

The following strategic must-win initiatives have been identified:
• Insulating Glass will capitalize on its most advanced and automated technology offering on the market by strengthening and broadening its presence in all main customer segments and regions, particularly in North America and APAC. The move towards carbon neutrality in Europe is already driving growth strongly within the EMEA. The increased focus on reducing the energy consumption of buildings is also expected to boost demand in other regions in the coming years.

• Heat Treatment will continue its systematic development work for increasing the level of automation towards a fully automated tempering line and modularity of products, while broadening the offering. Emphasis is also being placed on optimizing for cost efficiency and quality by, for example, further developing installation processes for an excellent customer experience. Glaston also sees attractive opportunities in solar panel glass processing technologies, in which demand is being driven by the shift to renewable energy.
• Automotive & Display will focus on automotive and selected display applications, as well as commercializing the most comprehensive product portfolio in the industry. Glaston will also continue to develop automotive heat treatment products to complement its market-leading pre-processing products for an integrated offering.

• Services aims to grow in all business areas throughout its product portfolio: spare parts, field services and upgrades, with increased focus on new upgrade development, particularly in the Insulating Glass and Automotive & Display businesses. Other focus areas include improved service accessibility, fast and easy spare parts ordering, as well as further development of the preventive maintenance and remote support concepts. Digitalization, access to data and Artificial Intelligence (AI) capabilities will continue to be important building blocks in creating new service models.

GLASTON CORNERSTONE INITIATIVES
Implementation of the business area-specific initiatives will be supported by improvements in commercial and operational excellence through five Group-wide cornerstone initiatives:
1.Innovate with customers to win focuses on strengthening Glaston's technology leadership (incl. digitalization) by seamless integration of customer understanding, and joint and faster innovation and development work.

2.Lead digital transformation includes building the tools and infrastructure across all Glaston operations to lead the industry's digital transformation.

3.Empowering Glaston people to thrive is essential to building the desired company culture. Leadership development and the leveraging of common leadership principles will play a key role in implementing the strategy and embedding it into everyday working life.

4.Elevate sustainability and continuous improvement will enable long-term success by building a stronger culture of continuous improvement and systematically progressing the sustainability agenda.

5.Master global sourcing and manufacturing will enable operational efficiency and growth through more harmonized sourcing and manufacturing processes.

Glaston's revised strategy is created in order to achieve clearly improved organic growth and profitability. The roadmap for 2021–2025 builds on Glaston's business area specific strategic initiatives. The successful execution of the strategy is supported by strong leadership and Group-wide cornerstone projects.

Glaston Corporation
Board of Directors
1) Glaston estimate, in euros. Glaston's addressable equipment market is expected to grow on average by more than 5% annually during 2021–2025. The growth rate of the addressable equipment market is expected to exceed that of the global flat glass market, which is expected to grow 3–4 % annually in 2021–2025, according to Grand View

Research, 2021.

Glaston's product portfolio is targeting those end-use areas of flat glass that are growing faster than average (e.g. insulating glass). The addressable equipment market also includes the customers' replacement investments after the operational life of machinery. During 2021–2025, replacement investments will be further derived from productivity gains, especially through automation, as well as technology and regulatory changes. Also, inflation explains part of the difference between volume-based and euro-based market estimates.
2) Calculation of key ratio: Comparable EBITA: Operating result before amortization, impairment of intangible assets and purchase price allocation +/- items affecting comparability
3) Calculation of key ratio: Comparable return on capital employed, % (Comparable ROCE): (Profit/loss before taxes + amortization of purchase price allocations +/- items affecting comparability + financial expenses x 100)/Equity + interest-bearing liabilities, average as of 1 January and end of the reporting period
4) Scope 1 emissions: direct greenhouse gas (GHG) emissions that occur from sources that are controlled or owned by Glaston (e.g., emissions associated with fuel oil, diesel and natural gas).

Scope 2 emissions: indirect GHG emissions associated with the purchase of electricity, heat, and cooling.

Fenzi SpA Expands Security Standards To Its Entire Supply Chain And Gains ISO 28000 Certification

The Italian branch of the leading group in chemicals for the glass processing industry has passed inspection with excellent marks, once again confirming it operates in compliance with all the quality requisites to obtain the most advanced supply chain security certification. The Group's Tribiano (Milan) plant is top-rated in supporting its customers, suppliers, partners and employees, ensuring compliance with the strictest security criteria and managing any possible risks with the appropriate tools, to the benefit of business continuity.

ISO 28000 certification for supply chain security requires management systems of criticalities and potential threats related to activities like theft, fraud, terrorism, piracy and counterfeiting, along all phases of the supply chain. By causing delays or outright closure, these potential risks could compromise the normal flow of deliveries and cripple manufacturing continuity. Such certification becomes even more vital precisely in times when hard-to-imagine, never-before-experienced events are part of a daily reality rife and complicates the international scenario with unknowns and unprecedented challenges to be dealt with.

With a special focus on shipping and logistics, the company implemented a management and monitoring system of possible risks or threats, safeguarding the traceability of supplies and of goods produced along the entire supply chain, thus optimizing daily operations and speeding up any customs checks, all to the customer's advantage.

Through the involvement of its own supply chain in the key organizational security measures developed by its in-house Quality Management Department, Fenzi SpA strengthened its partnerships with industry professionals to boost the widespread protection of the whole community that revolves around the Group. This certification is a huge milestone, the result of a lengthy, painstaking project to implement the most cutting-edge systems in all phases of the supply chain. And, in addition to the other quality certifications obtained by Fenzi, such as ISO 9001:2015 renewed in 2021, it once again substantiates the trustworthiness Fenzi has earned in 80 years of business and partnership with international glass industry players.

Unelko Offers Innovative, Invisible Shield® "Microburst" Glass Coating Machine

Unelko Corporation is pleased to announce the launch of their New Invisible Shield® Microburst™ Vertical Glass Coating Machine.

"The New Microburst glass coating machine was designed for large and small glass fabricators/manufacturers who rely on a high output, and efficient automated system to produce and protect a high volume of glass including shower glass, windows & doors, IG units," partitions, railings, sand blasted glass, windshields and more.

The Invisible Shield "Microburst" coating machine and their top-rated Invisible Shield PRO 15 Glass Coating protects glass with a durable, "Nano Scale" monomolecular coating that seals & protects glass for 15 years or longer against water/weather, soil, salt, acid/chemicals, stains, scratching, pitting, etching and environmental corrosion.
The machine was designed by Unelko Corp. and Perfect Score Technologies, a well-known glass equipment company in Dallas, Texas. According to Steven Ohlhausen President of Unelko, The New Microburst Vertical Glass Coating Machine took some time to develop, however it is the best performing glass coating machine of its kind in the industry. It is unmatched from a use, operation, efficiency, safety, and performance standpoint.

The compact, high output, vertical "two sided" glass coating machine is extremely efficient. It utilizes ultraviolet (UV) and infrared (IR) processes to cure and instantly bond the Invisible Shield PRO 15 Glass Coating to both sides of almost any size glass. It treats/protects 70 sq. ft. (7 sq. m) of glass per minute and 4,200 sq. ft. (420 sq. m) per hour with a high performance, hydrophobic/oleophobic coating. The glass leaves the machine durably protected and 99% clean. The Microburst Glass Coating machine can treat up to 8,000,000 sq. ft (800,000 sq. m.) of glass annually, in a single shift.

Unlike other coating machines that offer poor product performance, require extensive handling, expensive product vials, long curing times and excessive after cleaning, the Invisible Shield Microburst Coating Machine is fully automated, product efficient and is time, energy and performance driven. It has a height capacity of 7 feet, but machines can be customized for almost any height and width glass depending upon production needs.

Glass fabricators can treat 1 unit to 1 million units at the same per unit cost.
Importantly, the Microburst glass coating machine is a self-contained, safety-first design. It is extremely safe, emits zero fumes and has NEMA 4 rated, polymer coated "air sensor" enclosures and electrical boxes. The unit is made of 100%, alcohol/solvent -corrosion free aluminum, emits zero fumes and wastes no product. It is even outfitted with an automated "self-cleaning" spray function; features you just don't see on other machines, Ohlhausen stated.

The Microburst Glass Coating Machine comes with a Full Year (or 2000 cyles), Parts & Service Warranty and is outfitted with WIFI Diagnostics for Remote, On-Site Support & Service.

The Invisible Shield Microburst Glass Coating Machine and IS PRO 15 Glass Coating offer the most effective solution to prevent glass degradation & corrosion, for improved cleaning and long-term preservation of residential and commercial glass.

SOLARBAN® 67 glass adds sustainability, views to new Portland civic center devoted to social equity

Portland-based Lever Architecture specified the advanced solar control, low-e glass to support daylighting goals and to create a transparent barrier between the indoor and outdoor spaces of the new center.

As Oregon's first project to pursue LEED® certification at the Platinum level, the Meyer Memorial Trust in the heart of Portland's urban community combines investments in social equity and sustainability through building elements that include a saw-toothed photovoltaic (PV) roof, textured metal cladding and large, inviting windows fabricated with Solarban® 67 glass by Vitro Architectural Glass.

Portland-based Lever Architecture specified the advanced solar control, low-emissivity (low-e) glass to support daylighting goals and to create a transparent barrier between the indoor and outdoor spaces of the new center. The building was constructed by the state's largest private foundation with funds seeded by the estate of regional supermarket magnate Fred Meyer.

"We typically use Solarban® 60 glass, but for this building we needed a glass coating with a lower SHGC (solar heat gain coefficient), especially with large façade exposures on the west, south and east," said George-Michael Rusch, RA NCARB, an associate with Lever.

With a SHGC of 0.29 in a standard one-inch insulating glass unit (IGU), Solarban® 67 glass not only met the project's performance goals, but it also helped achieve the specific aesthetic Lever was seeking for the project. The glass "has a nice grayish hue without much green tint," Rusch explained. "On the top floor, the glass reflects the sky while still allowing inviting views to the interior on the ground floor when under a canopy or overhang."

The building is deliberately set back from the property line to create a welcoming "front porch" with plants, seating and views of the center's large conference room, which is called the "Center for Great Purposes," a phrase from Meyer's will.

The ground-floor curtainwalls on the east and south facades feature large glazing bays that emphasize the transparency of the Trust's public programs and showcase the beautiful timber interior and large blue-gray display wall in the lobby and function space. Mounting the curtainwall system directly to the load-bearing mass plywood columns enhanced this effect.

On the second and third stories of the 19,800-square-foot facility, Lever specified tall, punched windows, which, according to Rusch, "create a simple rhythm that does not take away from the massing and allows the texture of the metal panels to accentuate the form with shadow and light play."

The openings are intentionally staggered, with each window group corresponding to a specific program area. To maximize daylighting and views, each grouping contains at least three windows across the width of a 12-foot office area. "That gave us around a 40-inch width when allowing for structure between the punches," Rusch added.

For consistency on the elevations, all the window punches appear to be the same full floor-to-ceiling height, except for offices with furniture on the perimeter where, for contrast, Lever added a dark aluminum composite panel below the windowsill.

Reflecting the organization's equity goals, all workspaces are afforded the same natural light

and views, with the prime corner spaces reserved for conference rooms, a dining space and a library.

In addition to turning its benefactor's former tow-truck storage lot into a community anchor, the Meyer Memorial Trust building is enrolled in the Path to Net Zero with Energy Trust of Oregon. Beyond the high-performance glazing and solar roof, the structure incorporates multiple other sustainability features, including an energy-efficient building enclosure and heating, ventilation and air-conditioning (HVAC) system, on-site stormwater management, regional materials and native plantings.

Bird-Safe Glass at the National Aviary Earns Top Project of the Year Award from Environment + Energy Leader

Vitro Architectural Glass has announced that two bird-friendly glass installations at the National Aviary in Pittsburgh, PA, have received a Top Project of the Year Award in the elite Environment + Energy Leader Awards program.

The win is an indication that the program's expert judges consider the joint efforts made by Vitro Glass and Walker Glass to equip the National Aviary with energy-efficient, bird-safe glass a top example of the exemplary work being done today in the fields of energy and environmental management.

Since 2015, Vitro Glass and Walker Glass have partnered to produce AviProtek® E with Solarban® glass, an energy-efficient, award-winning glass product that combines bird-friendly, acid-etched patterns by Walker Glass with high-performance solar control low-e coatings by Vitro.

The National Aviary has installed AviProtek® bird-safe glass in two locations: its Tropical Rainforest exhibit, which houses over 30 different species of birds and was renovated in 2018, and its new Garden Room event and meeting venue. In the Tropical Rainforest, full-surface Velour finish, which mutes natural element reflections on the surface of the glass to deter bird collisions, was applied to Starphire® glass by Vitro. The Garden Room features Solarban® 72 Acuity™ glass by Vitro with AviProtek® acid-etched markers by Walker Glass on the first surface.

The Environment + Energy Leader Awards wrote the following in recognition of the National Aviary's bird-conscious construction: "The two projects illustrate how architects and building owners can unite the conservationist values with the practical considerations of designing, constructing and operating a beautiful, environmentally sustainable building."

One judge said of the project's bird-safe glass façade, "Who doesn't cringe when a bird hits a window? Any product designed to reduce avian mortality has my vote."

Another commented on the energy efficiency benefits of the project: "[AviProtek® E with Solarban® glass] has demonstrated energy performance data to back up its claims."

The Environment + Energy Leader Awards is a program recognizing excellence in products and services that provide companies with energy and environmental benefits, and in projects implemented by companies that improved environmental or energy management and increased the bottom line.

"With a very experienced and critical judging panel and a strict set of judging criteria, entrants faced an extremely high bar to qualify for an award in 2021," says Sarah Roberts, Environment + Energy Leader publisher.

For more information about Vitro's partnership with Walker Glass, visit vitroglazings.com/WalkerPartners.

Fenzi launches AquaglassXpack, the innovative range of water-based eco-friendly paints for hollow glass.

The Fenzi range of paints developed for the hollow glass industry is expanding with a new line of organic, water-based paints designed for glass packaging. Perfect for producing surfaces with transparent, opaque and metallic colors with extremely high resistance, based on industry tests and customer specifications.

AquaglassXpack benefits from the Fenzi Group's vast experience in formulating decorative paints for the glass industry that are specifically designed for bottles, tableware and glass containers. It demonstrates an extraordinary combination of high performance and ease of application, offering hollow glass manufacturers unique advantages in high-speed production with quality results.

Organic, one-part and water-based for decorative use, the AquaglassXpack paints are a combination of resins and select pigments that not only lend the paint exceptional hardness, durability and elasticity, but also unique colors. While maintaining intact all the features that have made Fenzi paints a very sought-after product in the marketplace, the new AquaglassXpack range guarantees excellent adhesion to the glass, exceptional mechanical properties of the painted film, superlative coverage, exemplary stability and durability of the color over time, outstanding UV resistance and the utmost in color brilliance.

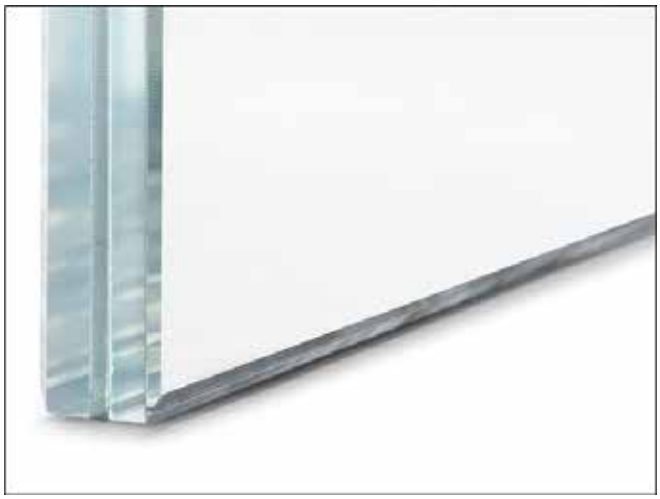
Easily spray-applied cold, these paints make it possible to satisfy the most diverse production requirements, even on high-speed, automated systems with high throughput. The special formulation epitomizes excellent functionality and easy paint drying, in the furnace or simply air-dried (24 hours at 35/40°C in a controlled temperature setting). After proper crosslinking, the glass can be further processed without any problem, thanks to the extraordinary stability of the paint over time.

The AquaglassXpack line includes transparent, colored, opaque and metallic water-based paints. With an unlimited and flexible color palette, Fenzi delivers countless customization options, even with special effects. Thanks to the Fenzi lab solutions, it is possible to achieve a series of virtually infinite shades and colors from among the international color scales, all faithfully reproducible. In addition, custom color samples requested by customers are ready in no time at all. Moreover, the RAL, RAL DESIGN, RAL EFFECT E2, NCS, Pantone, Dulux, Sherwin William, Sikkens, Benjamin Moore, British Standard, Taubmans and Guittet formulas are always available on the website: www.fenzi-aquaglass.com for fast independent production of the desired shade of color.

By choosing AquaglassXpack, customers are opting for the utmost freedom of expression in reduced environmental impact, thanks to the special water-based formulation and minimal VOC (volatile organic compounds) content. This line of products was developed without the use of dangerous, carcinogenic or toxic substances and is designed to provide products that are safe to use.

The hollow glass decoration system is formulated to comply with the guidelines of the international standards in effect, industry tests and specific customer specifications for the household goods, fragrances and food and beverage markets.

Guardian Glass to add jumbo laminated glass production line at Ryazan, Russia plant



To support the increasing demand for laminated glass in Russia and the Commonwealth of Independent States, Guardian Glass is adding a new jumbo laminated glass production line at its Ryazan, Russia plant.

This investment supports the region's strong growth in the commercial, residential and interior sectors and, from within those sectors, the call for glass products that address safety, security and acoustic performance.

As one of the world's largest manufacturers of float, coated and fabricated glass products, with 26 float lines around the globe, Guardian is taking a natural step forward in its strong, longstanding laminating capability. As a result, Guardian Glass Russia will offer the region an improved product mix including SunGuard® and ClimaGuard® coatings on laminated substrates for various applications.

Rising global demand for laminated glass is driven in part by architects and building owners demanding:
•Safety: When laminated glass breaks, it tends to stay within its frame because of the clear PVB interlayers, lessening the chance of injury.

•Maximum natural light: Larger insulating glass units, that combine Guardian high performance coatings and laminated glass, deliver expansive views as well as safety and security while managing light transmission and solar heat gain.

•Noise reduction: Acoustic laminated glass helps to reduce noise to create a more peaceful ambiance.

"This investment illustrates our continued optimism and excitement about Guardian Glass' expansion in Russia and the CIS," says Guus Boekhoudt, Executive Vice President, Guardian Glass. "This project underwrites our Vision to be a preferred partner to our customers, suppliers, employees and communities based on a foundation of mutual benefit."

"We appreciate our customers' support and are happy to keep evolving our relationship by offering them additional product options," adds Elena Rassudimova, General Manager, Guardian Glass Russia. "We are very proud of what our team and our partners are accomplishing in a challenging environment."

Laminated glass production is expected to begin Q2, 2023. For more information, visit guardianglass.com

Forel at Vitrum 2021:

Automation and Innovation

Forel confirms its belief in the strategical importance of Vitrum for the glass business and, as always, will be presenting its advances in automation and innovation at the event.

At the 2021 edition (5-8 October, Milan, Italy) in fact, the latest addition to the Forel insulating glass range will be on display in a fully automated configuration: a line for assembling insulating glass with a thermoplastic profile.

This solution will be part of a completely automated system managed by a single workstation (in keeping with the principles of industry 4.0), guaranteeing optimum precision and productivity.

The line will be fed by the Art. SS Sorting System - Forel's system for managing glass sheets within the production flow - which automates the storage and handling of panes to suit the manufacturing schedule. The advantages of the Sorting System are clear: no bottlenecks, no mistakes, and no slowdowns or indecision; clear improvements in productivity, order, flexibility, safety and quality.

The Sorting System will feed the thermoplastic profile “High Tech” insulating glass line. Making its début in this solution is the new Art. TA applicator, designed to perfectly position the product on the basis of two key principles: productivity and ease of use. The interface already includes all the most widely used work programs and the various options for thermoplastic products: it's simple, intuitive and user friendly. In another step aimed at boosting productivity, the profile thickness changeover process is completely automatic: the operator can produce a thermoplastic spacer of a different thickness by simply modifying the working parameters.

The product is pumped from the drum to the recirculation units, consisting of two units that work in tandem to feed the dosing equipment, guaranteeing non-stop extrusion. The benefits of this configuration are particularly clear when the drum needs replacing, as it means there's no slowdown in production. Continuous extrusion is further controlled by the temperature monitoring system that runs along the entire conduit.

The coupling press with gas filling art. AP has been enriched with a dedicated option for processing the IG pane with thermoplastic spacer. In any case however, this solution can also process panes with a rigid frame.

The final step is entrusted to the Art. SR “High Tech” sealing robot, which has already earned widespread appreciation for the production of rigid and flexible spacer and has also proved perfectly suitable for thermoplastic products. The process is completed with an innovative automatic unloading system, developed to suit the specific nature of this type of insulating glass, but useful also for IG units with traditional or flexible spacer, as a new resource of integrated logistics inside the glassworks.

As this is a dual purpose solution, Forel's products for the preparation of traditional rigid profiles will also be on show: the Art. PB profile bender, the Art. DF desiccant filling machine and the Art. MB butyl extruder. The profile bender (one of the top machines in its category, thanks to the exclusive “Smart Arm” patent) has also been enhanced with a series of innovations for bending plastic spacer, to offer a perfect 90° “radiusless” bend.

Forel's vertical processing line - consisting of the Art. EM edging machine, the Art. DM drilling and milling machine and the Art. VW washing machine - will also be on display at Vitrum 2021. This solution can handle arrissing, grinding, polishing, milling, drilling and final washing, on both

monolithic and laminated glass. The line features three machines that are independent of each other and can work simultaneously on different glass sheets, increasing productivity. With its patents, the Forel vertical processing line has been a best seller in its category for several years now, and is esteemed by the best glassworks all over the world.

"Forel has been taking part in Vitrum for over fourty years, and is a noteworthy presence in terms of both innovations and exhibition space" the company explains. "We believe Vitrum is an event worth supporting and strengthening, given not only its relevance on the national market but also the special significance of this year's edition. The world is just getting back on its feet after the challenges of the last 2 years, and this trade show will be the first major European event for the glass sector. Now's the time to show that our supply chain is up and running and is playing its part in the great, collective return to normality. Our intention is to attend at Vitrum with the same spirit as always: to present innovation and automation".

TIAMA INSPECTION WORLDWIDE ACQUIRES VIMEC

On May 31st, Tiama Inspection Worldwide announced the acquisition of VIMEC. Based in Eindhoven (Netherlands) and with more than 30 years of experience, VIMEC is one of the world's leading companies in the field of non-molded glass control & inspection for the pharmaceutical industry segment.

VIMEC developed strong expertise in controlling vials, ampoules, syringes, and cartridges at different steps of their production thanks to its machine vision solutions.

Most recently, VIMEC has been providing dedicated services for the inspection of vials used for the COVID-19 vaccine.

Tiama's objectives are to speed up VIMEC's growth by developing synergies (R&D, purchasing, etc.) and increasing VIMEC's Sales and Services presence to a worldwide level.

Tiama also plans to bring technologies it has already developed for food & beverage glass defect recognition (artificial intelligence, deep learning, etc.) to this pharmaceutical segment.

SentryGlas® at Seattle Space Needle

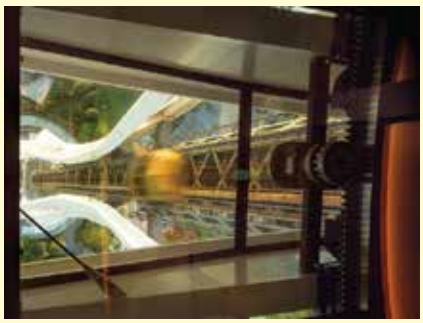
Space Needle experience completely revitalized thanks to advanced interlayer technology.

At 605 ft (184 m) tall, Seattle's Space Needle is one of the globe's most iconic structures. Thanks to its unique shape, the city's skyline is internationally recognised by 78 % of people – second only to Paris with the Eiffel Tower. Such is its presence, when the Space Needle is removed from pictures, identification of Seattle falls to just 8 %.

Built for the 1962 World's Fair, the Space Needle was designed to illustrate "the age of space" and has since stood as a symbol of mankind's space-age aspirations. As well as this iconography, the Space Needle also delivers breath-taking views of the city and the surrounding area, with its 520 ft (158.5 m) tall saucer-shaped "top house" offering visitors 360-degree indoor and outdoor panoramic views of the city, Mount Rainier, Puget Sound and the Cascades and Olympic mountain ranges.

Visitors get 360-degree indoor and outdoor panoramic views of the city, Mount Rainier, Puget Sound and the cascades and Olympic mountain ranges.

Due to these experiences, the Space Needle is an incredibly popular attraction, which is only set to get even better thanks to a recent venture that has focused on its preservation and renovation – a lot of which has included the deployment of the SentryGlas® Ionoplast interlayer from Trosifol™. "The brief," according to Richard Green, from consulting glazing engineers Front Inc., "was based around the question of how to keep this monumental tower relevant for the next 50 years. Following the creation of some initial ideas by design principal Alan Maskin and project architect Blair Payson of Seattle-based design firm Olson Kundig, significant research and surveys were undertaken to marry the two concepts of structural feasibility and what the public wanted to see. The local Landmarks Preservation Board agreed with the design concepts, but with the proviso that it needed a sensitive touch that did not change the external appearance and maintained the structure's iconicity."



Visitors get 360-degree indoor and outdoor panoramic views of the city, Mount Rainier, Puget Sound and the cascades and Olympic mountain ranges.

"The Preservation Board's approval was collectively what we were most nervous about," explains Blair Payson from Olson Kundig. "It took 18 months to get the project's designs approved, but we were helped by local historians who not only gave us great advice, but also recognized we were being very sympathetic to the original designs. Throughout the project, intuitively we believed the glazing design concepts were all practically achievable, which Front validated in the proof of concepts. We knew the industry was changing, that new technology was available and that we weren't trying to achieve the impossible."

Visitors get 360-degree indoor and outdoor panoramic views of the city, Mount Rainier, Puget Sound and the cascades and Olympic mountain ranges.

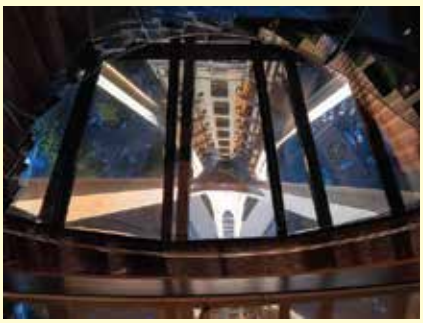
The renovation includes large amounts of structural glazing, incorporating SentryGlas®, which has been included to foster the Needle's original design intent – to deliver unobstructed views of the surrounding area. New features include multilevel viewing experiences through

floor-to-ceiling glass, including new 3.35 m (11 ft) high slanted, open-air glass walls and glass benches on the outdoor observation deck.

Two steel and glass staircases with radiating wood panelling – called the Oculus Stairs – connect this upper-level to The Loupe level below – which contains the world's first and only rotating glass floor – giving never-before-seen downward views of the tower's support legs.

The tower contains the world's first and only rotating glass floor for the restaurant and bar.

"The refurbishment has opened the aperture," Green explains, "taking the existing building and opening up the views to greatest extent possible. After completion in 1962, the original clear view was steadily whittled away over time as information boards, kiosks, safety fences and cages were introduced. This new approach is designed to limit anything that can block the view using contemporary safety glazing technology that was just not available back then. I would like to think that the original architects would be delighted with what has been achieved."



The observation deck barrier is made up of very big glass panels. You can see their edges and perceive their size, but after a while they totally disappear – adding to the thrill of the view.

The glass-panel formulations used in the various constructions are almost as impressive as the tower itself. The angled observation deck barrier comprises three 15 mm (0.6 in) panes of ultra-clear low-iron glass, sandwiching two 2.28 mm (90 mil) SentryGlas® interlayers.

The Loupe glass floor is probably the most impressive. From the bottom upwards it comprises two 6 mm (0.24 in) low-iron glass panes on either side of a 1.52 mm (60 mil) SentryGlas® interlayer.

A 20 mm (0.8 in) Argon gap separates this laminated panel from another, which comprises three 10 mm (0.4 in) glass panels sandwiching two 2.28 mm SentryGlas® interlayers. Completing this panel is a 0.2 mm (0.008 in) clear safety film and a 6 mm glass pane. In keeping with the Needle's original appearance, a soffit has also been installed on the underside, with a grey frit on surface one in order to mimic the original color of the materials used in the construction. This soffit comprises two laminated panels separated by a 16 mm (0.63 in) Argon gap. Both panels are made up of two panes of 6 mm non tinted low-iron glass sandwiching a 2.28 mm SentryGlas® interlayer.

At 605 ft (184 m) tall, the Seattle Space Needle is one of the globe's most iconic structures.

"The observation deck barrier is the most immediately impressive construction," Green explains. "It is made up of very big chunks of glass. You can see edges and perceive its size, but after a while it totally disappears – adding to the thrill of the view. We undertook extensive and very demanding testing for these panels, including fracturing all three plies and testing to their proof load. They were designed using the same principles as reinforced concrete, with the SentryGlas® interlayer delivering the necessary strength in the highly unlikely event of all three plies being broken.

With support only along one edge and at two corners, this testing was vital, especially considering they lean out at a 14.5-degree angle. Anything more than this and they would have been classed as overhanging. The SentryGlas® also addressed the problem of creep. With 3 m (10 ft) high glass panels only supported on two sides, standard PVB was not an option for creep resistance.

"When it comes to the soffit, the glass is not easily cleanable, so environmental resilience was important," he continues. "It has to maintain the historic appearance from the ground

upwards. We tested these panels by dropping one of the turntable motors on them. This drop obliterated the top two plies, but not the bottom two and the air seal remained intact, so it still had more than enough strength to support the weight of a person. A real testament to the capabilities of the interlayer."

A cross section through the building (image: © Olson Kundig)

"This project is a reflection of glass and interlayer performance," Payson explains. "The original designers wanted to use more glass, but at that time the technology was simply not available. The original 1961 model exhibited larger glass panels, but glass in the '60s did not offer the necessary wind-load capacity – this was further hindered by a glass shortage and budget restrictions – so they went as far as they could.

Architects have a real fascination with glass. It gives us the ability to break down internal and external distinction; and this was the perfect project to push glass to the practical technological limit."

Green concludes: "The next big thing on the horizon is the creation of a standard that will allow architects and engineers to design and use glass as a ductile failure mechanism; the idea being that you can design a structure to be reliable even if the glass breaks – that's one of the things that has made this project work. Using SentryGlas® we were able to exploit large glass panels with simple and slender mounts, because the glass just works… even when it's broken. Without that level of assurance when broken, the glass would have needed more support, which would ultimately have impacted the viewing experience."

Polaris Windows & Doors: FeneTech

Window and door production is complex. Fenevision ERP enables Polaris Windows & Doors to conquer that complexity.

Polaris Windows and Doors was a growing success in the late 1990s. The company had significantly grown its sales, customer base and product lines since it began making aluminum storm doors and windows in 1979 in Youngstown, Ohio.

But by 1999, order entry errors were common and costly. Plant floor equipment was not connected or integrated. Staff configured doors in spreadsheets. The company needed a better way to run.

"We had a legacy system for order entry, shipping and accounting," says Dave Cicozi, who has been at Polaris for 38 years and is now systems coordinator. "We had a stale, outdated window manufacturing software solution."

A Leap of Faith

To solve the issues, Polaris did something nearly everyone advises against: It became the first customer for an unknown new fenestration ERP system. In this case, FeneVision.

"With FeneVision, we first began with BOM setup, and with new technology, we were able to tie together our cutting and welding equipment," Cicozi says. "What I liked most was that we were able to integrate it into the middle of our current system." FeneVision has been essential for Polaris during the last 20 years as the company continued to add new lines and customers and grow.

"We wouldn't have been able to handle our increased production without FeneVision," Cicozi says. "The ascent of the software has kept pace with the advancements in our industry. It's just been phenomenal."

Flexibility is Key

Window and door production is complex. Fenevision enables Polaris to conquer that complexity.

Information Systems Manager Jamie Mallery says, "The software is so flexible with the availability of validation conditions, visibility expressions and production groups. The system is easy to use and easy to manage."

"Once we configure FeneVision, it's a seamless process from order entry through shipping and delivery," Mallery says. "My FeneVision experience is FeneVision is fenestration manufacturing solved. It's so customizable and flexible. It's a complete solution."

Cicozi adds, "Even with that flexibility, we can maintain consistency with, for example, those built-in validation rules and grouped production."

Consistent. And more efficient.

Producing More with Fewer People

The ability to make ongoing efficiency improvements is another reason Polaris continues to build its future with FeneVision.

"Our volume has increased," Cicozi notes, "but the growth of our support staff has been minimal. We're able to produce more with fewer people. The efficiencies we've gained with FeneVision have been invaluable."

Polaris further improved efficiency and customer support when it implemented the FeneVision WEB module,

"With WEB" Mallery says, "our customers have visibility into what is happening with their orders. They can see production status, which allows them to service their customers with much more accuracy. They know when something is going to be delivered because it tells them right on their dashboard."

Which allows Polaris to be more efficient.

"60 percent of our customers enter their own orders, saving our internal staff time and effort," Mallery says. "Deploying WEB has increased the visibility of our customers and decreased our employees' workload."

RMAs and Tracking

The benefits to Polaris go beyond remote order entry. The tracking modules installed 20 years ago continue to deliver benefits.

"The Tracking and Trucking modules are extraordinarily helpful," Mallery says. "We scan items through production then move those finished goods to the shipping docks. This guarantees our shipping paperwork, including the all-important shipping manifest, is highly accurate."

And Polaris plans to add more capabilities.

"We're looking forward to when we get new scanning devices for the drivers and deploy the Delivery module," Mallery says. "I'm also looking forward to deploying RMA (Return Merchandise Authorization). We're still developing that project, but I see huge benefits to the RMA module as we move away from a legacy process to a FeneVision process."

A True Partnership

Cicozi says the ongoing partnership with FeneTech has been invaluable.

"From the beginning, FeneTech has listened to our needs and acted upon them," Cicozi says. "FeneTech staff discusses with us what we need, then comes up with ways to not only meet our needs but make whatever it is make it more efficient."

"They do a phenomenal job supporting us." This includes continually improving FeneVision.

Cicozi says FeneVision gives Polaris the tools they need to conquer production complexity. "And if something's not there? A couple of emails or phone calls, and we work through it."

"FeneVision is the total package," Software Project Coordinator Eric Davignon says. "From the front end at quote and order entry to the back end with production and then on to shipping—FeneVision does it all."

Mallery adds, "We've never worked with a company that's as interested in our problems as we are."

And those previously too-frequent order entry errors? Cicozi says, "Today with FeneVision it's unheard of. FeneVision allows us to order in any configuration, and we know that when we place an order, it's placed correctly."

WERU & LiSEC: Deep trust as the basis for decades of success

The cooperation between WERU and LiSEC began when WERU started to manufacture insulating glass.

WERU, a traditional German company that started out as a carpenter's workshop, is the oldest window production factory in Germany. The more than 1,000 employees of the WERU Group produce over 400,000 sashes and around 10,000 front doors every year.

Behind WERU's success lies a history that is rich in experience, sustainable thinking and the attitude of never being satisfied with the standards achieved. WERU performs continuous quality assurance from production to installation, certified by the RAL Quality Mark. Production takes place at the three German locations in Rudersberg (Baden-Württemberg), Triptis (Thuringia) and Salmtal (Rhineland-Palatinate).

WERU QUALITY MADE EXCLUSIVELY IN GERMANY

WERU GmbH is one of Europe's leading manufacturers of windows and front doors and can reflect back on a success story of over 175 years. WERU was founded in 1843 and the product portfolio was expanded through the merger with UNILUX GmbH in 2014, to include wood and wood-aluminium products and create a comprehensive full range.

Behind the success of the companies lies a history that is rich in experience, sustainable thinking and the attitude of never being satisfied with the standards achieved. Today, the WERU Group positions itself as a future-oriented company that demands maximum individuality. Modern windows, large lift-slide combinations, front doors in all material variants bring dynamics to the home and in doing so enrich both the façade as well as personal life.

WERU & LISEC

WERU distinctly positions itself as a complete solution provider. True to the motto: Everything from a single source. With LiSEC as a long-standing business partner, the decision was made in favour of a company with the same objective. The cooperation between WERU and LiSEC began when WERU started to manufacture insulating glass. At that time (and still today), LiSEC was the only company on the market to offer complete systems, from glass cutting to logistics, including its own LiSEC software.

"Business is always conducted between people. When two strong brands come together for a joint project, this means mutual professional planning and concept design, clean implementation by both parties, and the pleasure of being successful together," says Clemens Macarei, Head of Product Management at LiSEC and point of contact for WERU for decades.

TRUST AS THE BASIS FOR PURCHASING DECISIONS: WERU CONTINUES TO INVEST IN LISEC SYSTEMS

In 2020, a new high-performance machine for automatic laminated glass cutting was put into operation: The VSL-A. Following WERU's decision to invest further in the laminated safety glass (LSG)

sector, the decision was very quickly made in favour of a LiSEC system. The purchase was made directly at the trade fair. "Data, facts and figures were very important to us, in particular the issue of material savings and how the system adds up, in other words the profitability. The confidence that the machine would be a success was very high, thanks to our experience of outstanding cooperation with LiSEC in the past," says Jens Reimann.

VSL-A: THE HIGH-PERFORMANCE SYSTEM FOR AUTOMATIC LAMINATED GLASS CUTTING

The VSL-A combines state-of-the-art laminated glass cutting technology and decades of LiSEC know-how in automatic laminated glass processing. Depending on the optimisation, up to 30 % higher cutting capacities are possible. Automatic rotation of the sub-plates is part of the standard equipment, as is automatic residual cut disposal, and reduces operator intervention to a minimum. In addition, two cutting heads ensure an automatic tool change.

WERU PLACES GREAT VALUE ON SUSTAINABILITY

The topic of sustainability is very important to WERU. The traditional company focuses on sustainable production and material processes, as well as smart, future-oriented products. Not only when it comes to glass, but across the entire production process. The VSL-A supports this by reducing glass consumption. On average, 6 % glass consumption can be saved by the VSL-A.

FUTURE PROSPECTS: MUTUAL FURTHER DEVELOPMENT OF LISEC & WERU TO CONTINUE

"Our cooperation with WERU is characterised by a strong sense of partnership. Both companies benefit from the advantages of the other and further develop together," says Markus Ensafi, LiSEC Sales Manager.

ERMI tiama group

Mid 2019, Tiama and Ermi decided to enter a cooperation bringing their complementary skills together to guarantee an adequate support to all customers with a perfect continuity, and to offer a qualified service.

With more than 15 years of experience, 2 retrofit sites in France (Nangis) and Portugal (near Porto), and a strong know-how, Ermi already upgraded or renovated more than 500 machines for plants located in 14 different countries, since 2005.

The 2 companies coming together allowed Ermi to improve its production tools. Thanks to this, the new site of Nangis was created, an extension was made to the site of Portugal and some new equipment were also added in both plants.

Today, Ermi works thoroughly on the maintenance, renovation, and upgrade of carousel machines among the 2,400 of the Tiama machines fleet installed worldwide or even among the carousel machines from other suppliers.

Tiama and Ermi collaboration is a success and Ermi represents a perfect fit for Tiama and all the special projects and cases they deal with.

Şişecam reported investments of TRY 838 million in the first half of 2021

Şişecam's net sales reached TRY 13 billion in the first half of the year

A global player in the glass and chemicals industries with production activities spanning 14 countries in four continents and with sales to more than 150 countries, Şişecam reported consolidated net sales of TRY 13 billion for the six months ended June 2021. International sales accounted for 64% of Şişecam's total sales during this period. Capital expenditures were recorded at TRY 838 million and exports reached to USD 327 million in the first half of the year.

Şişecam CEO Görkem Elverici commented on the Company's results: "Despite the climate of uncertainty caused by the pandemic, Şişecam delivered a strong financial performance in the first half of the year, exceeding its performance in the same period of the previous year. Şişecam continued to create value for its stakeholders with its proactive decisions and practices that generate value for its entire ecosystem. In the coming period, we aim to continue moving forward toward our global goals. We plan to take the next steps on our sustainable growth journey with our transformation projects that will render Şişecam future-ready, our investment plans, and our robust governance capabilities."

Şişecam's 2021 first half-year consolidated net sales totaled TRY 13 billion and international sales of the Company – comprised of exports from Turkey and sales from non-Turkey facilities – accounted for 64% of total revenue. In the first half of the year, Şişecam produced 2.7 million tons of glass, 1.2 million tons of soda, and 2.5 million tons of industrial raw materials.

During this period, thanks to its proactive decisions and practices that generate value for its entire ecosystem, Şişecam achieved a strong half-year financial performance exceeding the same period of the previous year, the era just prior to and at the start of the pandemic. As evidenced by the solid results it recorded in the first half of the year, Şişecam once again demonstrated its strong corporate governance capabilities by achieving a financial performance that also exceeded the same period of 2019, the pre-pandemic period.

Despite the climate of uncertainty caused by the pandemic, we delivered a strong financial performance.

In his statement on the financial results, Şişecam CEO Görkem Elverici indicated that Şişecam created sustainable value for its entire ecosystem in the first half of 2021, a time when global pandemic-rooted extraordinary conditions sustained and in a climate marked by ongoing uncertainty.

He added: "With consolidated net sales totaling TRY 13 billion in the first half of the year, we further contributed to the macro economy and the growth of anchor industries to which we provide input with our products, investments, and employment opportunities. Şişecam successfully reached its ambitious targets in the first half of the year thanks to its robust corporate governance capabilities and agile practices. Moreover, it delivered a strong financial performance, exceeding that of the previous year which coincided with the pre-pandemic period. Şişecam recorded financial success that surpassed not only the same period of the previous year but also the half-year results of 2019, which refers prior to the outbreak of the pandemic. We will continue to conduct our business activities by leveraging our robust

competencies and agility. At Şişecam, we aim to create value for all our stakeholders by modifying our business processes and plans as needed in the coming period, for which the extent of the impact of the global pandemic remains uncertain."

Thanks to our function-based governance model, we will more effectively manage our business operations across four continents.

In its 85th anniversary year, Şişecam made one of the most important decisions in its history: To merge all of its business activities under a single roof. Görkem Elverici stated the following about the transformation initiatives that Şişecam has designed to better prepare itself for the future: "We have successfully completed the merger process. This large-scale consolidation was a crucial turning point in terms of our long-term strategies and competitive targets in global markets. Immediately afterwards, we focused on implementing transformation projects aimed at creating a more integrated, digital, optimized, operationally efficient organizational structure and building Şişecam of the future. To this end, we made a strategic decision to introduce significant changes to our governance model. At Şişecam, different business fields – such as glass packaging, glassware and chemicals – were formerly managed independently within a field of activity-based organizational structure. Now, we have a function-based organization and management approach. As a result, we no longer manage our business processes on a business line-basis, but rather based on functions, such as Sales-Marketing or Production. I firmly believe that our new organizational structure will ensure more effective and agile management across our region of operation spanning four continents in various lines of business. The experience and competencies we have gained with a focus on product groups will further expand Şişecam domain of influence."

We are reaping the rewards of our strategic decisions and best practices.

Elverici stated that Şişecam is currently reaping the rewards of its transformation efforts, digitalization practices, and strategic decisions during a time when business models have changed profoundly due to the global pandemic.

He elaborated: "As a result of the challenges accompanying it, the global pandemic offered organizations an opportunity to test their decisions and practices and revamp their structure to align with the new market conditions. During this period, Şişecam also had the opportunity to test once again its readiness for the unanticipated developments, its ability to make fast decisions, and adaptability skills. The successful projects and competencies we developed on our digitalization journey played a critical role in managing this process effectively. In addition, our strategic positioning with respect to our production activities spread across 14 countries on four continents enabled us to navigate the negative effects of the disrupted global supply chain much more easily. In the coming period, we plan to further boost the economic value we generate and our global competitive edge with investments and projects that will prepare Şişecam for the future."

We are creating value for all our stakeholders with our new investments.

Şişecam, the founder of the Turkish glass industry and a global pioneer, remains committed to making uninterrupted investments that will create value for all of its stakeholders and supporting the growth of the industries to which it provides input.

Elverici added: "Despite the climate of uncertainty and extraordinary conditions created by the global pandemic, we continued our investments without interruption in line with our priority to meet our customers' glass demand and to create value for the economies. In the coming period, we aim to create sustainable value for our stakeholders while expanding Şişecam's global footprint with strategic moves we will make in the right areas by continuing our investments with the same approach. As part of these efforts, we announced that start of our first European facility investment in glass packaging industry, in Hungary. We expect this greenfield facility investment with a capacity of 330,000 tons to be online 2023 and to reach its full capacity by the year-end 2025. Capital expenditures focusing on increasing our existing 2 million ton flat glass production capacity in Turkey by 25 percent are also underway. We expect to achieve this goal by both improving our existing lines and investing in two new float lines."

Turomas returns to Vitrum 2021

After a period of uncertainty, the glass industry is approaching a new era with the Fourth Revolution and the Spanish company is channelling efforts in the research, design and development of new machines, software, and solutions 4.0.

TUROMAS will be present at the new edition of VITRUM – the international trade show specialized in machinery, equipment, and systems for flat and hollow glass and in glass and processed products for industry – to take place October 5-8 at the Fiera Milano Rho exhibition district.

The Spanish brand will make the most of this opportunity to present its complete range of machinery standardised for monolithic glass, laminated glass or smart storage to visitors who come over to stand N15 – P14 in hall 22P, as well as offer them personalised solutions.

Since its beginnings in 1985, TUROMAS has in mind that it is not only about selling a machine to load, cut or store glass, it is about accompanying the user throughout the whole process until they find the comprehensive solution that they truly need.

Industry 4.0 – Turomas Software

The industry is approaching a new era with the Fourth Revolution. The large corporations are driving and strengthening digital transformation processes. The digital infrastructures, interconnections and automatic production systems, motors for competitiveness, will also have special emphasis at Vitrum 2020.

The launch of the TUROMAS Innovation and Special Development Centre (CIDET) has provided with an ideal place to devise and give birth to TUROMAS Software a new range of products based on Industry 4.0. These applications understand how industry works, based on the data provided by the machines themselves.

They run state-of-the-art software that guarantees ideal interconnection of the machines with any ERP Optimiser available on the market.

The software solutions provide optimal use of resources to manage production from a single control interface, monitoring and controlling glass stock in real time or managing non-automated glass warehouses.

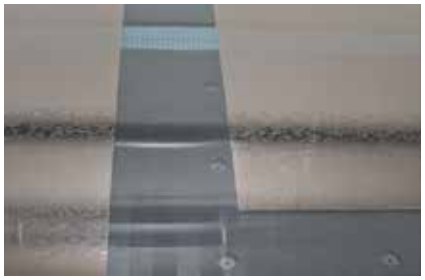
Their control interface has been carefully designed to meet the requirements of the end user: adaptability, intuitiveness, and ease of use.

Information is power, and that has been the aim of TUROMAS: to provide the necessary information to make our customers' day-to-day work easier – in a standardised, open way for all software manufacturers.

New machinery developments

During the last few years, the need to offer higher quality products with lower environmental impact has led glass suppliers to develop a wide variety of high-performance coated glass. These new products have generated a demand in the market: a decoating system capable of eliminating a wide range of coatings as well as managing the associated waste from the process.

Turomas, therefore launches a



new generation of edge deletion systems able to meet the needs of today's market and the requirements of the most demanding customers: larger amounts of glass in multiple coating formats.

In addition to the innovative decoating system, a new machine model has been developed to revolutionise the concept of glass loading. This has been made possible thanks to more than 30 years of experience with the TUROMAS Suction Cup Loading System.

The RUBI 406VA is an autonomous cutting table for 6-metre glass equipped with automatic loading system – VA. Its innovative design enables the loading, cutting and automatic unloading of glass, ensuring maximum productivity and automation in the smallest possible space.

The automatic loader is integrated into the structure of the cutting table itself, optimising the processes in just 35 m2. It means extensive economic and logistical benefits for the customer.

2020 and 2021 will be remembered as the years that have put us to the test, that have brought out the best in us to overcome situations that had never been encountered before. Trade fairs have been cancelled, limiting our commercial life and direct contact with customers and suppliers for quite some time.

Now is the time to meet again and discover how TUROMAS and its new developments can help you get the most out of your flat glass processing.

EXPLORiT at the Science and Technology park in Yverdon-les-Bains

The triple insulating glass from Glas Trösch contributes to the high energy efficiency of the building.

With the EXPLORiT, the Y-Parc in Yverdon-les-Bains is gaining a new and multifunctional centre that combines leisure, education, business and a range of services under a single roof. Situated at the heart of the largest science and technology park in Switzerland, this avant-garde new building designed by the Philippe Gilliéron firm of architects is both a local eye-catcher and a magnet for visitors from across the country.

The wing of the building consists of two elements, which are connected via a fully glazed atrium that serves as an access level. The triple insulating glass from Glas Trösch, which incorporates layers for sun protection and thermal insulation, contributes to the high energy efficiency of the building and helps ensure the maximum well-being of visitors.

The fully glazed atrium is the architectural connection between the two main components of the building. © EXPLORiT

Playful learning at the science and technology park

Learning through play – this is the underlying concept of EXPLORiT, which is well established in the form of ‘edutainment centres’ at numerous locations across Switzerland. These interactive educational centres are predominantly oriented towards the STEAM learning method (science, technology, engineering, art & mathematics), an educational approach that gives children and adolescents an understanding of the respective disciplines by encouraging independent exploration and experimentation.

The didactic offer encompasses several experience-oriented exhibitions and places of learning such as Kindercity and Sciencity, which can be enjoyed by visitors to EXPLORiT in the Y-Parc Science and Technology Park in Yverdon-les-Bains. In keeping with the spirit of the location, it has also been possible to realise a diverse social infrastructure that benefits the employees of the 200 businesses that operate on site. As well as restaurants, shops and cinemas, these include co-working spaces, maker spaces for start-ups, wellness offers and a broad range of service providers.

Standing at the centre of the glazed atrium is a 14 metre-high, 150 metre-long ramp made of regional wood. © EXPLORiT

An architectural heart of gold

Situated in Switzerland’s largest science and technology park, the new building is not only an architectural landmark but is also its functional heart. The project from the Philippe Gilliéron firm of architects expresses this both in form and cubature as well as in the design of the façade: The 100-metre-long wing of the building is situated in a central location and covers an area of around 14,000 square metres, while its six-storey tower marks the highest point of the entire Y-Parc.

The essential allure of the building is also underlined in a more figurative sense – the shimmering gold of the anodised aluminium façade elements can be seen from some distance. Functionally, the project is divided into two main components, connected via a fully glazed atrium that serves as an access level. While one part houses the educational and recreational activities, the other accommodates the shops and offices.

While the cubature of the building as a whole blends in well with its surroundings as a long and low structure, the ‘business’ part of the building features three additional floors. © EXPLORiT

Energy efficiency with a transparent aesthetic

As a place for training young people, the building is geared towards sustainability – a requirement that it is also able to fulfil in terms of energy use. Alongside a solar system on the roof, a standalone network for autonomous power supply and a system for heat recovery, the use of triple insulating glass with the SILVERSTAR EN2Plus thermal insulation layer from Glas Trösch helps ensure that the building meets Minergie P energy efficiency standards. “The planning of the fully glazed atrium posed a particular challenge,” explains lead architect Mehdi Rouissi. “It was important to us to emphasise the transparent aesthetics of the atrium as a connecting element of both structures, and at the same time meet all of the requirements for heat and sun protection.”

Here, the modern triple-insulating glass scores on three fronts: In the summer, the low solar energy transmission of the SILVERSTAR SUNSTOP Silver 20 T sun protection layer prevents the atrium from overheating, while the SILVERSTAR EN2plus thermal insulation layer ensures low heat losses in the winter. This approach ensures maximum transparency for the atrium, with no need for roller shutters. Thirdly, overall energy consumption and CO2 emissions are kept to a minimum thanks to the low heating and cooling requirements.

EXPLORiT – the new heart of Y-Parc, Switzerland's largest technology park in Yverdon-les-Bains © EXPLORiT

SOLARBAN® 60 Glass Supports Living Building Challenge Petal Certification for Seattle Office Building

To promote exterior views, daylighting and occupant comfort architect Weber Thompson specified Solarban® 60 solar control, low-e glass from Vitro Architectural Glass for the retail spaces and punched openings.

Pursuing Seattle's aggressive Living Building Pilot Program (LBPP) certification, the sleek new 7-story Watershed mixed-use building features high-performance glazing, red-list-compliant products, enhanced indoor air quality and rainwater reuse.

To promote exterior views, daylighting and occupant comfort—and to help achieve Living Building Challenge Petal Certification and meet City of Seattle performance metrics for energy and water—architect Weber Thompson specified Solarban® 60 solar control, low-emissivity (low-e) glass from Vitro Architectural Glass for the retail spaces and punched openings.

"Specifically, we have to use 25% less energy per square foot than a baseline office building after Watershed is fully occupied, so the stakes were high for the building to perform," explains Myer Harrell, AIA, LEED AP, AIA, LEED AP BD+C, Homes, principal, director of sustainability, principal, Weber Thompson, Seattle. "In addition to systems that future tenants can control, one of the major ways we accomplished this was through an efficient core and shell building envelope, including the glazing. Solarban® 60 glass helped contribute to that, proved out by our Energy Analyst's model."

In exchange for LBPP certification, The Watershed was permitted to increase the amount of floor space in the building by 15%, enhancing the project's economic feasibility with more rentable space.

While Weber Thompson—which occupies the building's second floor—considered other glazing options, the design needed to balance good solar heat gain protection, clarity and cost, and Solarban® 60 quickly emerged as the best option. With a solar heat gain coefficient (SHGC) of 0.39 and visible light transmittance of 70% in a standard one-inch insulating glass unit (IGU), Solarban® 60 glass provided the clear aesthetic the firm wanted without sacrificing energy performance.

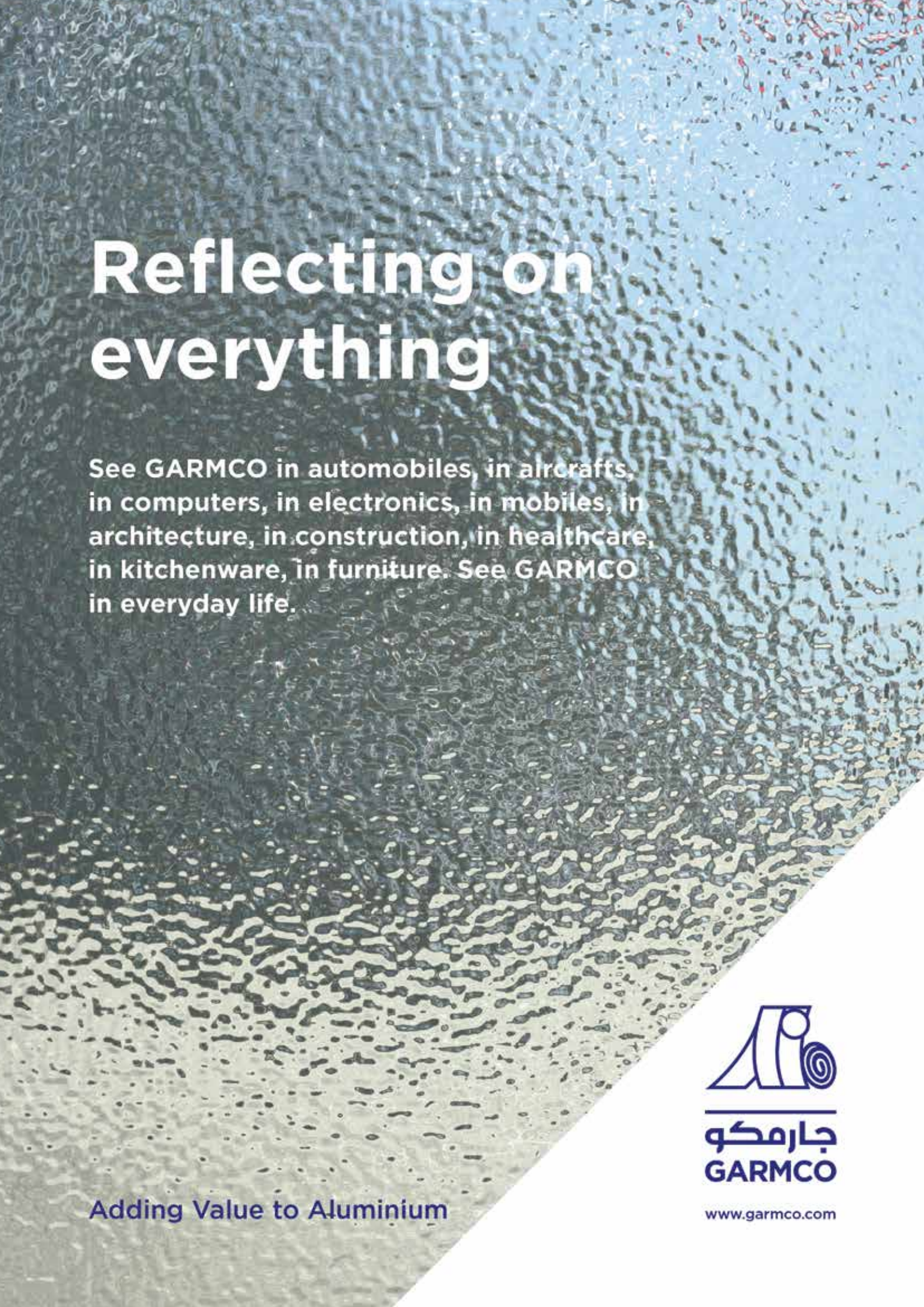
Facing south, Solarban® 60 provides occupants on all floors with great views of downtown Seattle, Mt. Rainier, Lake Union and the George Washington Memorial Bridge, while the west elevation lends nice exterior views and good "people watching" along Troll Avenue. The openings are an average of 3 ½-feet wide by 9-feet high.

Weber Thompson's design incorporates a number of outdoor spaces including an open-air entry lobby, an exterior connecting stair, several roof decks accessed by office tenant spaces, and expansive landscape and hardscape improvements.

"All of these outdoor spaces promote health and wellness, chance encounters between building occupants and connection to the elements and seasons," states Harrell. "This is supported by good glazing – connecting the indoors to outdoors, especially at the retail ground floor, Troll Avenue entrance, and the open-air lobby where these connections can be maintained without sacrificing energy performance."

Further, the 60,000+ square feet building was designed to increase efficiency, reduce operational costs, integrate with the surrounding environment and positively impact the broader community.

The Watershed's energy use data will be tracked and displayed in real time on a dashboard in the lobby while Weber Thompson's usage data is displayed on a separate dashboard in its second-floor lobby.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Tiama Xlab – the revolutionary 3D sampling solution

Turn virtual reality into reality with the new Tiama Xlab.

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The 3D image can be rotated and "dissected" on all sides. Virtual volume, capacity, and vacuity can be measured as well as glass distribution fully mapped. You can also analyse engraving, embossing and much more. Practically all container types and shapes can be inspected and it's non-destructive because the image (and not the container itself) is "cut" virtually.

For an online presentation of the Tiama Xlab please contact us at **marketing@tiama.com**.

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Data – the deciding factor