Glass-Technology International

THE LEADING MAGAZINE FOR THE INTERNATIONAL FLAT GLASS INDUSTRY

May/June • Year 32 • No. 3/2021

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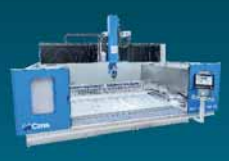

3-4-5 AXES CNC MACHINING CENTERS

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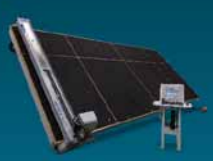
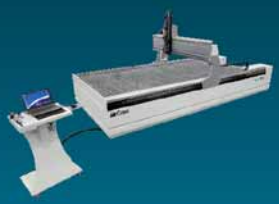


CUTTING TABLES



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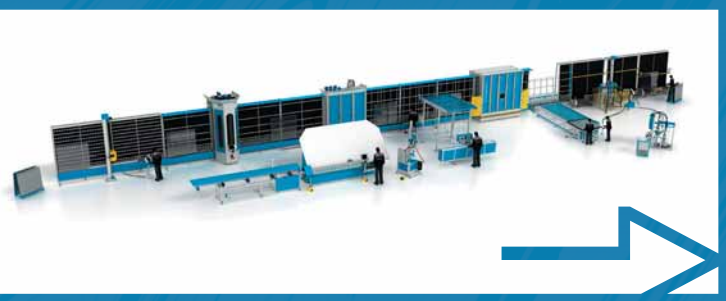

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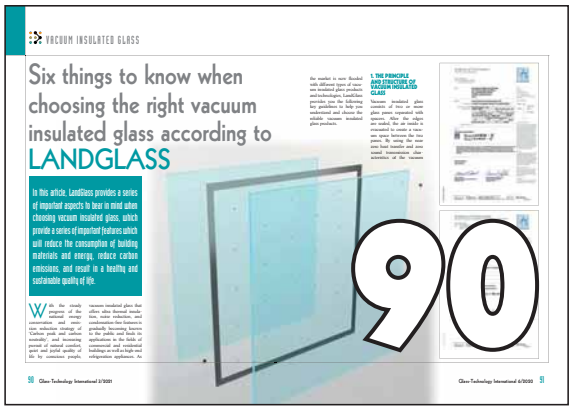

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GLASS-TECHNOLOGY INTERNATIONAL, N.181, ANNO 32, 2021 - PERIODICO BIMESTRALE.

regular features | regul

Textiles for the glass industry

Textiles for the glass industry used to cover and line rollers and ovens for tempering flat glass and for covering bending moulds and pliers for transferring hot glass.

1210N Aramtex® discontinuous filament tapes

Aramtex® tapes are produced using 100% pure paraaramidic yarns with continuous filaments, that are usually woven in several layers, using particularly fine yarns that render the positioning surface extremely homogeneous and smooth and thus preventing the still hot sheets of glass from being scratched. Aramtex tapes have excellent mechanical characteristics (excellent resistance to cutting, abrasion, tearing and compression) while their heat resistance characteristics remain unaltered.

1207T Tenack square packing

Tenack square packing is made by braiding wires of AISI 316 L stainless steel. The packing, which withstands high temperatures and has excellent mechanical properties, is suitable for the glass industry as protection for parts that may come into contact with hot glass that is still soft to prevent thermal shock and microcracks. The packing is very flexible, elastic and easy to handle. It is an excellent substitute for Aramtex® products when temperatures exceed 350°C.

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BOVONE

ELB 102 straight line edgers for 'perfect' polishing of glass edges

Elettromeccanica Bovone, founded in 1954, has always been owned and managed by the Bovone family. The company is present worldwide, with two branch offices in USA and Brazil, and thanks to a consolidated network of qualified agents that often also provide technical service and spare parts, while the company's team of experienced technicians is always available.

One of the most recent developments of Bovone is the ELB102, a straight edger for the perfect polishing of glass edges, with a series of distinctive advantages:

- very high quality of both flat edge and arrises;
- high and continuous processing speed for higher and constant productivity over time;
- versatility: ELB 102 responds to the productivity needs of large industries and at the same time lends itself perfectly to the fine specifications of small glass workshops.

Bovone has, in synergy with its subsidiary Bovone Diamond Tools, recently successfully completed several tests on different wheel configurations: the goal achieved by Bovone R&D is to drastically reduce customers' production costs while maintaining the same high quality production. Configured in this way, wheels have a longer life cycle, reducing production time and maintain the excellent standards of polishing for which Bovone grinders are globally renowned.

Industrial glassworks, pushed to very high production rates, can therefore count on a technological partner that puts them in a position to compete successfully on the every market: operating at high rates when necessary and calibrating production to high quality polishing standards whenever required.

Changing the wheel setup of the machine, alternating the different setups of grinding wheels supplied, allows to calibrate the production mode of the machine in order to respond to requests for large batches and, at the same time, raise the quality standards of the final polishing outcome.

The machine is automated for better usability even by less experienced operators, and is equipped with an automatic wear recovery system on the polishing wheels in fifth and sixth position, while the spindles themselves have an air pressure system to keep the wheels constantly in contact with the glass. The perfect flatness of the edges, compared to all other similar machines, is the other most important quality feature of the machine.

The industrial capacity of Bovone allows the company to carry out all production phases in-house: this direct control guarantees excellent quality of raw materials but not only. Bovone machines are famous for their sturdy cast iron base and cutting-edge construction solutions that are integrated with high-end electronics. The development and integration of the control software, and right up to the proposal of the most suitable tool, thanks to the synergy with the subsidiary Bovone Diamond Tools, give life to 100 per cent reliable technology, guaranteed by a company that has been successfully operating on international markets for over 65 years.

The ELB 102 straight-line edger works constantly at speeds over 2.5 meters per minute. The possibility of integrating the ELB 102 in robotic automatic systems allows avoiding time-consuming loading and unloading operations.

ELB grinders integrate with articulated, multi-axis robots in fully automated BRS (Bovone Robotic System) systems: automated islands for grinding, represent the perfect solution to optimize production.

The polishing finish, in addition to being qualitatively impeccable, must also be kept constant over time: the flatness of the edges polished by Bovone is flawless in response to the high standards imposed by very demanding application sectors such as architecture and furniture. In this case, the coupling of the large glass sheets imposes quality standards regarding edge finishing and flatness of absolute excellence.

Last but not least, the customization potential of the ELB 102 allows each solution to be calibrated according to the specific needs of individual customers, from 'micro' pieces with extraordinary finish, to large glass sheets for external architecture.

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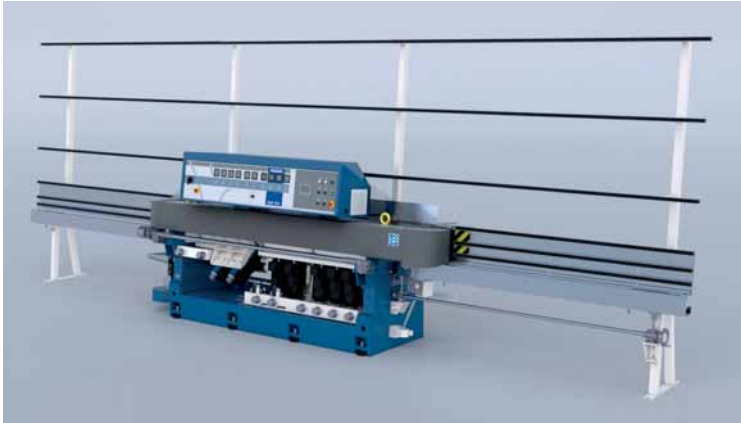

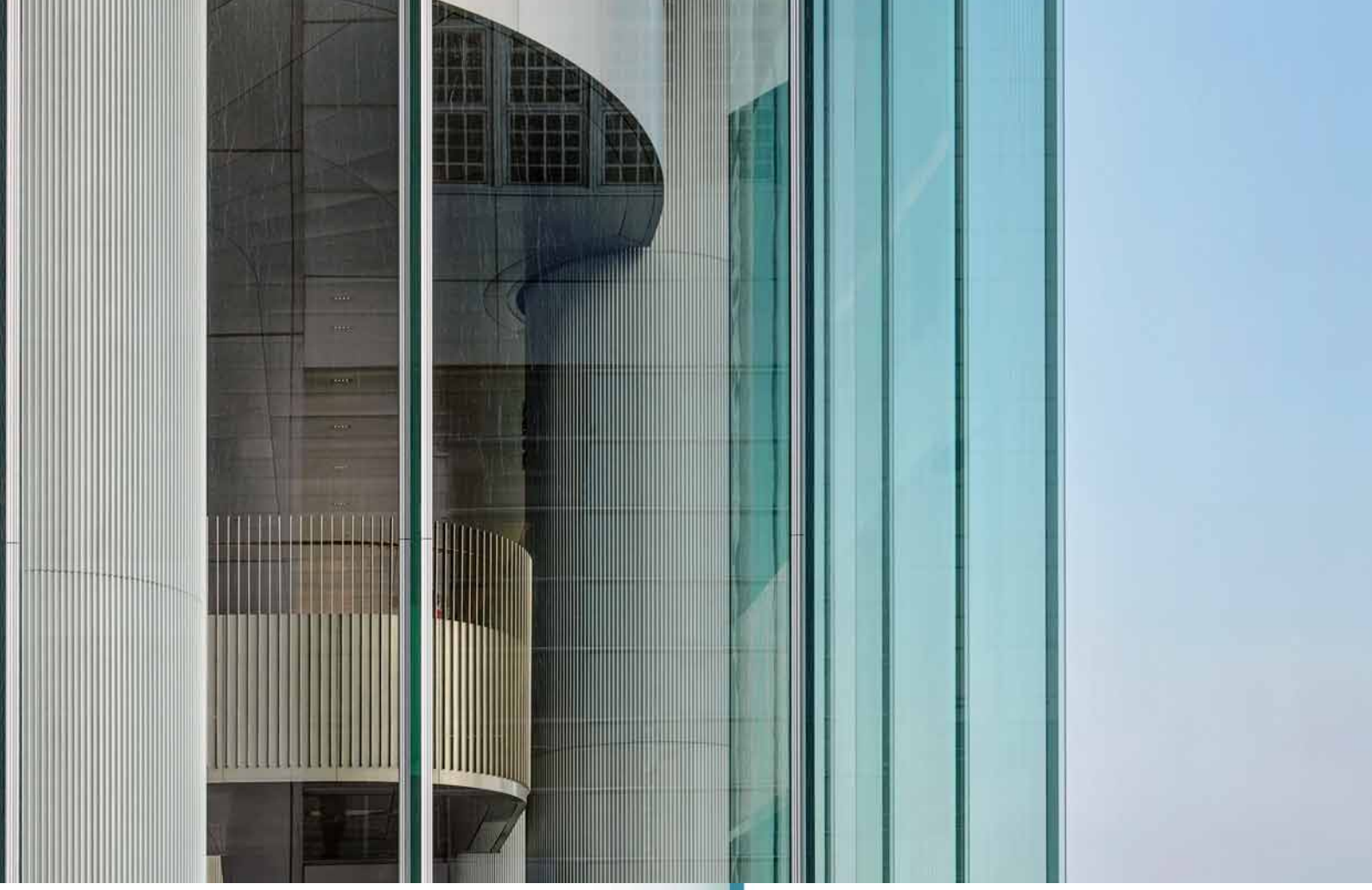

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ICG

United Nations approves 2022 as the International Year of Glass

We received the following press release from Alicia Durán, Research Professor CSIC, President of the **ICG**, Chair of IYOG2022, recently informed us that the United Nations has approved 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. Glass supports many vital technologies, facilitates sustainability and a green world and enriches our lives, yet often goes unnoticed.

This exciting journey began in 2018. Support came from 1500 Universities and research centres, societies and associations, museums, artists, educators, manufacturers and companies in 78 countries on five continents. Having successfully negotiated the disruption caused by the pandemic, a draft Resolution outlining our ambitions was negotiated with the Missions of several UN countries during April and passed the silent process on 11 May. The formal resolution was agreed at the United Nations General Assembly on 18 May 2021. ICG send their heartfelt thanks to the Spanish Mission at the UN, particularly the Spanish ambassador Agustín Santos Maraver and Ana Alonso, who led this process through the difficult twists and turns of diplomacy in stressful times.

Alicia Durán says: "My deepest thanks go to all who responded to our vision. I need to cite some special persons such as David Pye and John Parker, but do not forget the many experts and colleagues that collaborated to create splendid videos and documents justifying our project; they were always ready and overflowing with ideas and support."

"Today begins 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 Steering Committee, based on representatives who can coordinate effectively with national institutions, will promote the best ideas and multiply their impact."

"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, 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."

"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."

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AGC GLASS EUROPE

Partnership with FINEO and Schüco

Following on from their already active collaboration, **AGC Glass Europe** and Schüco have now agreed to enter into a strategic development cooperation to pool know-how and technical expertise, exploit synergies in research and so actively promote the development of forward-looking solutions with vacuum insulating glass and aluminium systems.

Requirements for high sustainability and future viability of buildings are increasing. Smart and innovative technologies and materials are becoming more and more important. This includes, among other things, the use of vacuum insulating glass (VIG) inside window or façade systems.

Dr Karl Stefan Dewald, Head of the Façades business unit at Schüco, commented on the strategic partnership, "With AGC Glass Europe, we have found the perfect partner to help us meet the future requirements of the market and customers"

Serge Martin, CEO **FINEO® Glass,** also said, "We are very honoured by this partnership, as Schüco represents high-end premium systems and has a leadership position on the market. To embrace FINEO as an innovative product is an opportunity for both of us. We are convinced we will offer outstanding solutions to the market, which will combine high performances, sustainability and design."

With its FINEO vacuum insulating glazing, AGC Glass Europe embraces innovative technology. The ultra slim glazing (from 6 mm total thickness) achieves unmet thermal and acoustic performances, and better light transmission.

The Schüco Group is at the cutting edge of technology, always setting high quality standards and premium solutions. The obvious adequation of Schüco with FINEO makes it a perfect partner for AGC Glass Europe. In addition to meeting the highest comfort and design requirements through slim constructions and low weight, Schüco façade and window systems with FINEO vacuum insulating glazing above all meet demands in terms of sustainability and energy saving – through optimum thermal insulation performance and the unrestricted recyclability of FINEO.

WWW.AGC-GLASS.EU/EN - WWW.SCHUECO.COM/WEB2/COM

SAINT-GOBAIN

Continued planned investments in India

Saint-Gobain has announced that it will continue its planned investment of more than INR 25 billion in greenfield and brownfield expansion in India in two years.

Santhanam B., chairman and managing director of Saint-Gobain India, said, "We are ahead of the curve on the investment front." He added, "Based on the long-range plan, as a group, we will be completing investments of INR 25 billion in FY22 and FY23. We are creating larger facilities, looking at potential acquisitions, investments in start-ups, accelerating spends on digital transformation and increasing R&D spend."

The plan includes two investments of INR 5 billion each in capacity expansion and an investment of INR 10 billion in a greenfield plant to manufacture building materials for which the location is yet to be finalised.

The investments in start-ups and inorganic growth would be over and above the committed investment.

WWW.SAINT-GOBAIN.CO.IN/

GUARDIAN GLASS

New float glass furnace in Luxembourg

Guardian Group has announced that it will invest in a new float glass production line in Luxembourg, at the Bascharage production site. The existing furnace will be replaced at the end of 2022, and the new furnace is expected to be operational in 2023.

The new facility will improve energy efficiency as well as the overall environmental performance of float glass production, significantly reducing energy consumption and carbon emissions. This facility modernisation programme will receive investment aid for environmental protection from the Ministry of the Economy.

Guardian merged its two production sites located in Dudelange and Bascharage in 2020. As part of the investment programme, Guardian Glass will consolidate all of its production activities, including the Dudelange rolling mill in Bascharage.

Guus Boekhoudt, Executive Vice President of Guardian Glass and Managing Director of Guardian Europe, said, "The story of Guardian Glass in Luxembourg began 40 years ago in Bascharage with the group's first float glass production plant outside the United States. Thanks to this new investment in Bascharage, glass production in Luxembourg will continue for the next 15 to 20 years. I would particularly like to thank the Luxembourg government, and in particular the Ministry of the Economy, for all the support given to the development of Guardian in Luxembourg."

WWW.GUARDIANGLASS.COM/EU/EN

CORNING

USD 45 million awarded from Apple

Apple is awarding USD 45 million from its Advanced Manufacturing Fund to **Corning Incorporated,** a supplier of precision glass for iPhone, Apple Watch, and iPad. The funding will expand Corning's manufacturing capacity in the US and drive research and development into innovative new technologies that support durability and long-lasting product life, building on both Apple and Corning's deep commitment to protecting the environment.

Skilled technicians in Harrodsburg, Kentucky, are part of the more than 1,000 jobs Apple's investment supports across Corning's US operations.

Corning has already received USD 450 million from Apple's USD 5 billion Advanced Manufacturing Fund over the last four years. Apple's investment helps support more than 1,000 jobs across Corning's US operations in Kentucky, USA, and other facilities. The investment has also helped facilitate research and development into state-of-the-art glass processes, which led to the creation of Ceramic Shield, a new material that is tougher than any smartphone glass.

"Apple and Corning have a long history of working together to accomplish the impossible," said Jeff Williams, Apple's Chief Operating Officer. "From the very first iPhone glass, to the revolutionary Ceramic Shield on the iPhone 12 line-up, our collaboration has changed the landscape of smartphone cover design and durability. Ceramic Shield is a prime example of the technologies that are possible when deep innovation meets the power of American manufacturing. We're so proud to work alongside Corning, whose 170-year-old legacy is a testament to the ingenuity of the US workforce."

The new front cover of the iPhone 12 line-up features Ceramic Shield, a glass-ceramic which gets its strength from nano-ceramic crystals

With support from Apple's Advanced Manufacturing Fund, experts at both companies worked together to develop a new glass-ceramic, which gets its strength from nano-ceramic crystals, produced in Corning's plant in Harrodsburg, Kentucky, the

facility where every generation of iPhone glass has been made.

The new material was enabled by a high-temperature crystallization step which forms nano-crystals within the glass matrix. Those specialized crystals are kept small enough that the material is transparent. The resulting material makes up the revolutionary Ceramic Shield, which Apple used to fashion the new front cover featured on iPhone in the iPhone 12 line-up. Prior to Ceramic Shield, embedded crystals have traditionally affected the material's transparency, a crucial factor for the front cover of iPhone because so many features, including the display, the camera, and sensors for Face ID, need optical clarity to function.

"We are incredibly proud of our collaboration with Apple on Ceramic Shield, made possible in part through the Advanced Manufacturing Fund and the hard work and dedication of hundreds of individuals at Corning and Apple," said Wendell P. Weeks, Corning's Chairman and Chief Executive Officer.

"We thank Apple for our long-standing product-development partnership and for their continued commitment to supporting the American workforce. The deep investment they've provided for new manufacturing technology in our Harrodsburg, Kentucky, facility is not only fuelling life-changing innovation, it's also helping us sustain vital communities where we live and work – a fundamental objective at both of our companies. Together, we're developing a world-class workforce, engaging them in new technologies, and creating opportunities for learning and training."

WWW.CORNING.COM/WORLDWIDE/EN.HTML

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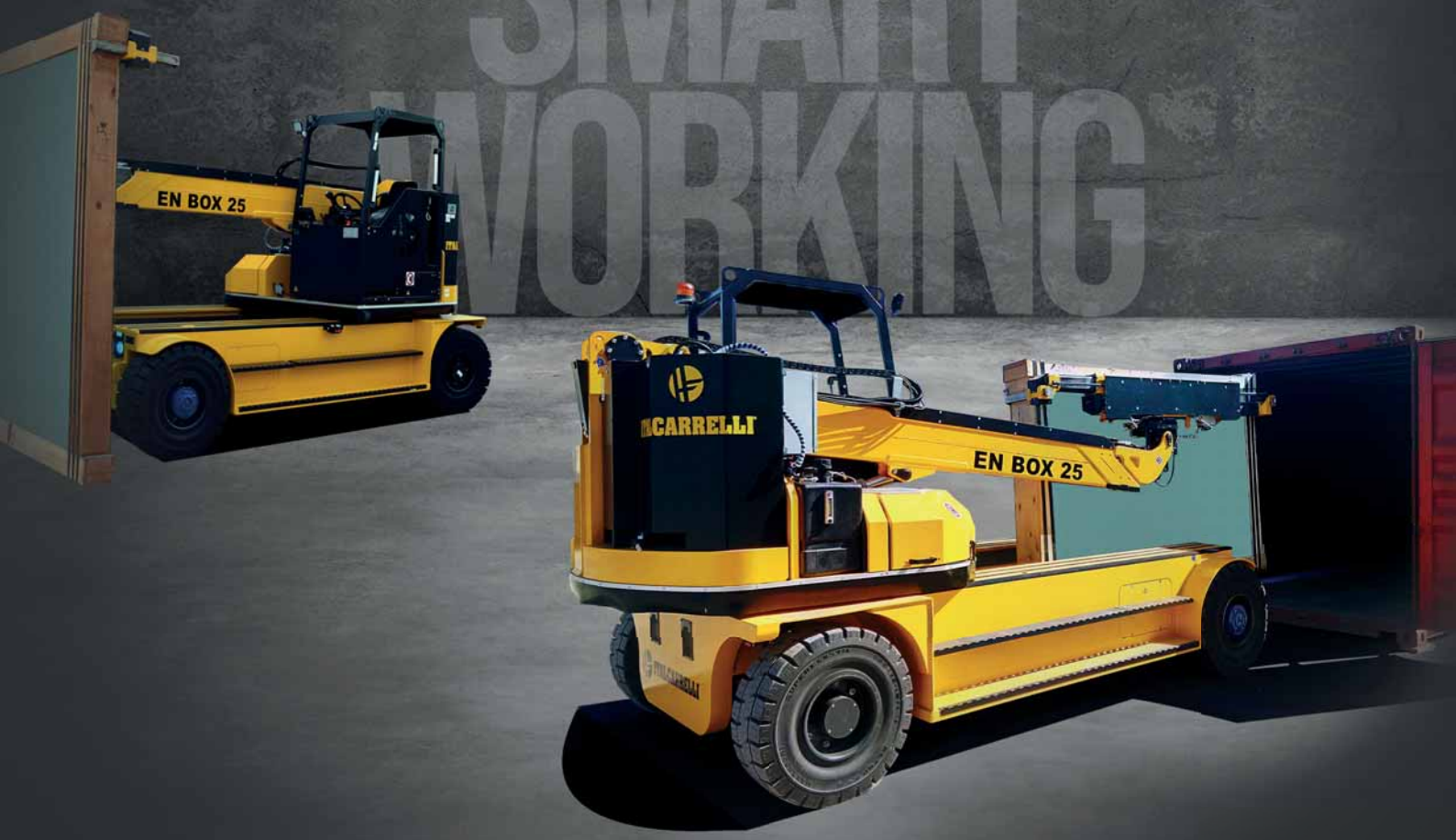

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CMS

Continuous growth and investments

The production centre at **CMS'** Zogno, Italy plant, has been enhanced with a new, state-of-the-art wing. An entire area designed specifically for the largest machines: 85,000 square meters that fully respect the environment and surrounding landscape, where the machines are moved using eight overhead cranes that can hold 15 tons each. Some facts and figure:

- 7,740 sq.m. overall covered area of the new plant;
- the usable internal height of the building is 12 meters; lighting in the production areas is supplied by 200 Led floodlights that guarantee an average illumination in excess of 350 lux;
- approximately 10,000 meters of electric wiring was laid when the wiring system was being created.

The warehouse façades, along with their impact on the surrounding landscape, were designed in collaboration with the architect Cinzia Robbiati from the Archeology, Fine Arts and Landscape Authorities for the provinces of Bergamo and Brescia.

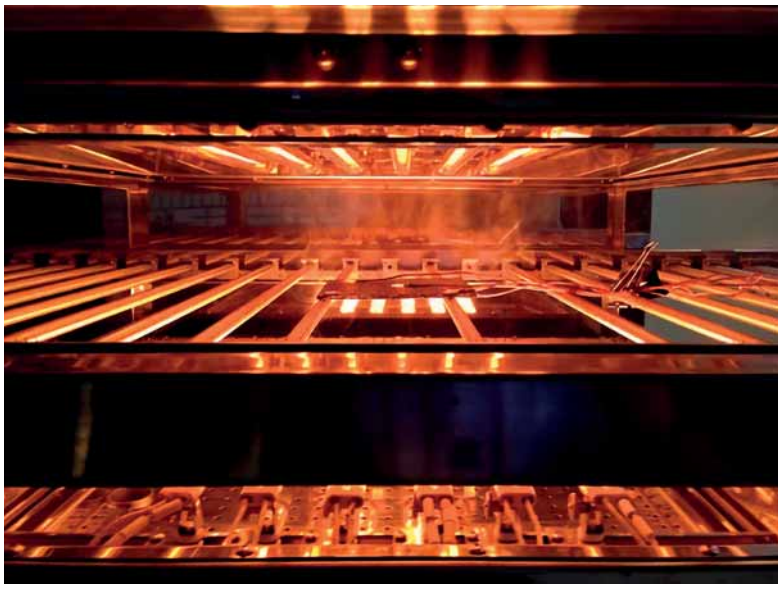
Its energy rating is Class A1 while there is a solar panel system with 504 polycrystalline solar panels fitted on the roof providing an overall maximum power of 150 kW.

The flooring is 48 cm thick and was designed to withstand trials directly on site, and can support dynamic weights of 3,500 kg with differential yielding of less than 2 hundredths of a mm

WWW.CMS.IT

HELIOS QUARTZ

Cutting-edge infrared test centre



In the last few years, **Helios Quartz** has developed a cutting-edge infrared test centre at its historical production plant in Cambiago, Italy, where customers can perform tests on several types of materials and for different applications and markets.

These tests are part of the collaboration of Helios Quartz with its partners to help them choose the most suitable infrared or UV lamps; they can determine needed process time and distance for example and, at the same, time see first-hand the product they are going to buy and use.

All this allows to avoid mistakes and engineering flaws and help partners improve their systems.

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MAPPI

New HST testing equipment for Tecnoglass

Tempered glass is subject to risk of spontaneous breakage. This risk might also derive from a particularity of the glass production process. It may happen that at the time of blast furnace processing, nickel sulphide particles are created inside the glass sheets. They are invisible particles, but unfortunately, following the tempering process they tend to change size. Over time, this causes internal tensions in the tempered sheet which can lead to a spontaneous breakage.

Fortunately, there is a test capable of identifying the glass sheets subject to this risk: the HST, Heat Soak Test. During the test, the glass sheets are brought at about 290°C and maintained at this temperature.

This speeds up the breaking process: plates destined to spontaneously break should explode during the test; those that pass shouldn't have this kind of problem in the future. The HST is regulated by the UNI EN 14179 standard, a mandatory test for sheets intended for building façades.

HST by **Mappi** is a component of tempering furnaces with all the design accuracy and production quality that have always distinguished the Italian company's products. This was the choice made by **Tecnoglasss Group**, the Italian company that has established itself as a model of quality and technical expertise in the production of insulating, safety and acoustic glass.

About his choice Mr. Sardano of Tecnoglass said: "We already have an ATS 4.0 and we are absolutely satisfied with it. It seemed natural to us to also choose the HST by Mappi, we are sure to find once again design and construction quality, reliability and friendliness. Would you have done differently?"

WWW.MAPPI.IT

GLAS HERZOG

13 years of Viprotron Quality Scanner 3D

Founded in 1948, **Glas Herzog** has developed into a pioneer in insulating glass production. The company supplies Germany as well as neighbouring countries with high-quality glass products of all kinds. As a certified company, Glas Herzog lives a high quality standard that is second to none.

For more than 13 years, **Viprotron** has supported Glas Herzog in the quality assurance of its high-quality glass products. In 2008, the first Viprotron scanner was put into operation at Glas Herzog. The insulating glass lines were successively equipped with further Quality Scanners. After investing in a new insulating glass line in 2020, the fourth Quality Scanner 3D is now successfully in operation.

With the Quality Scanner 3D, Glas Herzog automates the monitoring of glass quality at the highest level. Thanks to the unique 3D technology, which also produces three different camera images per defect by means of three detection channels, all types of glass defects in monolithic panes are reliably detected. In addition to any glass coatings, satinized and sandblasted glass is also reliably inspected with the 3D scanners.

For the employees at Glas Herzog, the Quality Scanners have become an indispensable part of current production. They work intensively with the 3D scanners on the various insulating glass lines thanks to the intuitive interface and reliable defect allocation. In addition, the quality reports, which the scanner automatically generates from each glass, are also used by quality management to check the justification of customer complaints.

Andreas Herzog, Managing Director at Glas Herzog, said, "Viprotron scanners are an integral part of our everyday business and we can recommend them without reservation."

WWW.VIPROTRON.DE/EN/

CMS GLASS TECHNOLOGY

Acquisition of GFP

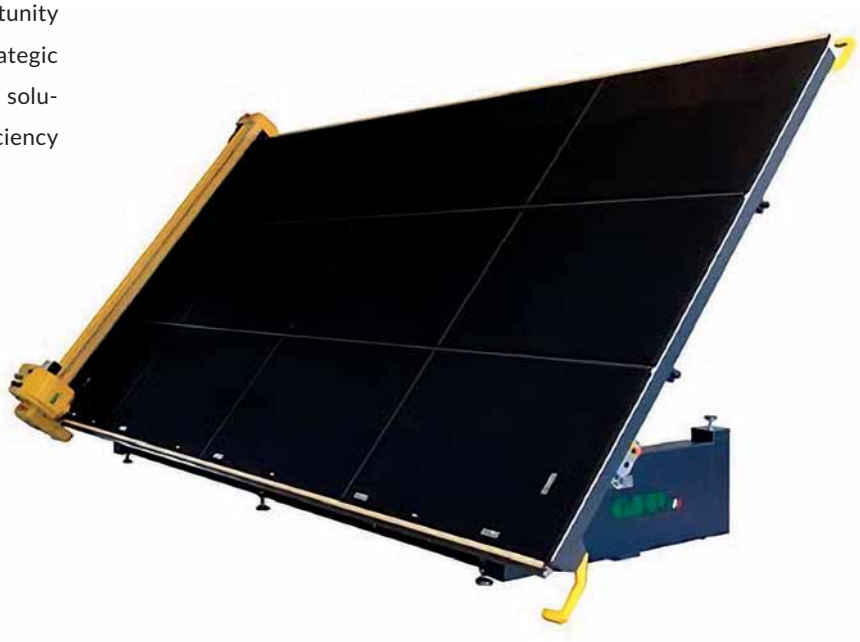
CMS has announced that it has acquired **GFP**, an Italian company specialized in cutting tables and seaming machines for glass processing.

"The operation will give CMS Glass Technology," said Giovanni Negri, CEO of CMS, and Dorian Campagnola, Director of CMS Glass Technology division, "the opportunity to expand the range of products and services in a strategic way guaranteeing our customers more technological solutions to win the most demanding challenges of efficiency and quality."

Claudio Pietrobelli and Dario Zenere, shareholders of GFP, will maintain their strategic roles in GFP in sales, design, manufacturing and service. They will be supported by Dorian Campagnola to ensure the correct alignment with CMS Glass Technology.

"This strategic operation – said Claudio Pietrobelli and Dario Zenere – make us look to the future with a lot of optimism, allowing GFP to benefit of all the advantages of being part of an international group without giving up our DNA."

WWW.SCMGROUP.COM/IT/CMS - WWW.GFPM.IT/EN/INDEX.HTML



GLAS TRÖSCH

Neutral façade glass

Façade trends are changing rapidly from distinctly blue, green or even brown tones to more neutrality less bright colours. **Glas Trösch Group** has already responded in giving the architectural world much more neutrality through its extensive SILVERSTAR High Performance coated glass product range.

The key innovation is to have better neutral appearance of façades thanks to the magnetron coating process. Each pane of glass reflects the light to a greater or lesser extent and therefore creates a reflection colour that can vary considerably. The intensity of the colour depends on the degree of light reflection.

Glas Trösch manages to avoid these intense colours by supplementing the silver layers with intermediate layers of metal oxides. These reduce the light reflection and thus make the glass look more neutral. Products that are now in particular high demand include the SILVERSTAR COMBI layers with a light grey shade, available in various levels of light transmission from 70% to 40%, and g values from 0.35 to 0.22.

For example, the SILVERSTAR COMBI Grey 40/22 with its low g-value is particularly suitable for those that want to achieve very low carbon energy efficient buildings. These coatings will also help for LEED and BREAM certifications.

WWW.GLASTROESCH.COM/EN/HOME.HTML

FIVES

PV glass lehrs geared towards greener industry

Driven to meet its climate commitments over the last years, China continues to focus on its solar glass production. The country became the world's biggest manufacturer of photovoltaic (PV) products aiming to reduce coal usage and increase renewable energy sources. PV glass is a technology that enables the conversion of light into electricity by the means of transparent semiconductor-based photovoltaic cells. While the PV glass demand is outpacing the production capacity, local glass manufactures rush to expand existing workshops and build new installations. In addition, a new market trend has developed to replace traditional backboards of solar modules with another layer of PV glass to extend panel lifetime.

Following the burst of solar glass production, **Fives** has supplied more than 60 annealing lehrs in China over the last 12 months. A new contract for a 6m width lehr – the widest lehr currently in China and internationally – with a production capacity of 600 tonnes per day has recently been signed by Fives Stein Metallurgical Technology (Shanghai), a Fives' subsidiary in China, with *Hebei Yingxin Glass Group*. Yingxin is a private glassmaker located in Shahe City, Hebei Province, which is known as the 'China Glass City'.

"We have been leading technical innovations in annealing lehrs for automotive glass, ultra-thin and PV glass over the last ten years, which allowed us to have a great amount of the local market supply, including to *Xinyi Glass*, *Kibin* and now Yinxin. Increasing the lehr for the glass ribbon width from the current 5.2m to 6m can save energy consumption up to 10%, which leads to a decrease in production costs by up to 5%," said Yun Pan, Managing Director of Fives Stein Metallurgical Technology (Shanghai), a subsidiary of Fives in China.

WWW.FIVESGROUP.COM

TECHNOFORM

Durable IG units thanks to Sparklike Laser Portable™

Technoform is a family company with over 45 production and sales sites worldwide. As a manufacturer of plastic profiles, they have a global presence with more than 1,500 employees.

Thanks to Technoform's numerous locations, they are always there where their expertise is needed: at the customer. For the same reason, Technoform is able to build on a flexible and worldwide network in which they share their knowledge and many years of experience in extrusion.

Technoform offers durable thermally optimized solutions for the glass edge bond in insulating glass, such as hybrid spacers made of plastic and stainless steel for the warm edge. An optimally constructed and harmonized glass edge bond is decisive for the quality and durability of a window. Technoform's products, which are already installed in the insulating glass units (IGU), save more than 1.5 million kWh of energy every year. In this way, Technoform is helping to significantly reduce global levels of CO2 emissions.

Technoform has been using **Sparklike's** Laser Portable™, the non-destructive insulating gas measurement device, since 2019. Technoform offers non-invasive TDLAS measurements of IGUs with the Sparklike Laser Portable™, as a service to support all participants along the entire value chain in the quality assurance and further development of their products. The big advantage: the gas measurement can be used for quality assurance in the middle of the process, at the end of the insulating glass line or in the already installed state. This ensures real safety along the entire value chain for all parties involved.

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GLASTON

Carey Glass purchases 2,500 milestone 'EASY-LIFTER'

The sale of the 2,500th EASY-LIFTER machine is a milestone for **Glaston**, with the foundation for this success originally laid by the former *Armatec* company and then continued under the former *Bystronic* glass brand and finally under Glaston now.

With an impressive 1,000,000 sq.ft. production facility that boasts 12 insulating glass (I.G.) lines and 12 tempering furnaces, **Carey Glass** has been pushing the boundaries of what's possible with glass for over 55 years. The company processes 14,000 sq.ft. of glass every day, so it is essential to be able to move the various glass types with ease.

The Glaston EASY-LIFTER enables an operator to carry flat glass quickly and easily, having rigid guidance and its own low dead weight. Movement is light as a feather which reaffirms why this is one of the most popular products in the UK glass processor's portfolio.

For this EASY-LIFTER investment, the rigid load guidance is already proving a great advantage on the production floor, as the glass can always be suctioned with its lower edge being completely horizontal when hanging in the air. Handling glass safely and accurately is essential, particularly in such large premises as those at Carey Glass. Minimum operator intervention is required with adjustable lifting speed and all vacuum creation handled by the powerful Venturi nozzles, where each pad has a secure, self-holding system. Time consuming readjustments to the insulating glass units have now been eliminated at Carey Glass, with fast, flexible and safe glass transportation incorporating ergonomic and economic aspects via this device.

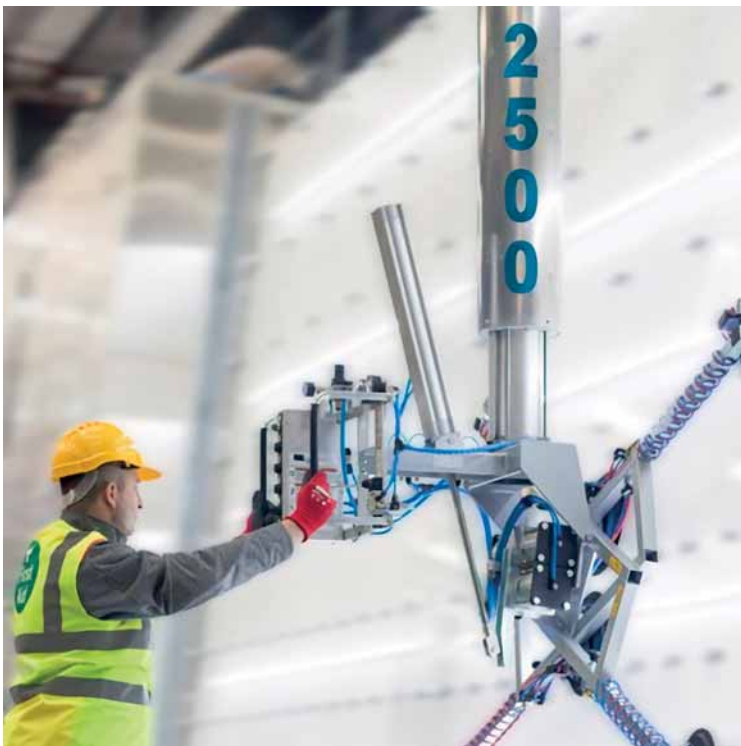
As the EASY-LIFTER can easily rotate, tilt, incline and turn glass on the production floor, it guarantees safe and flexible handling for the operator. Furthermore, it can feed and remove glass units for I.G. sealing, tempering furnaces, pane turning or screen printing.

Carey Glass is focused on customer care, ensuring that only the best quality products are supplied, on time and with excellent technical support. The company is proud of the reputation it has established over the last 55 years, with a large number of national and international key companies who carry out large commercial projects. In addition, for those requiring products for smaller refurbishment projects the company will happily work with smaller fabricators and manufacturers to provide complete solutions across the sector.

The company's commitment to providing the best processed glass available means they continually invest in the latest machinery, regularly and thoroughly test their processes and maintain standards of quality that exceed all industry requirements.

Evelyn Carey, at Carey Glass commented, "As we have total in-house control of the quality and delivery requirements for each customer's project, we have to invest in reliable equipment and machines that meet our needs. Handling such high volumes of glass means that we must keep production methods as simple as possible where necessary without losing any of the guarantees. As we process all glass types in-house, with a highly qualified and experienced team, the EASY-LIFTER greatly simplifies handling for them. We are also thrilled to be part of Glaston's production story, having purchased this 'special' EASY-LIFTER – it certainly is proving its worth."

HTTPS://GLASTON.NET/



GLASS INDUSTRY

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GLASS GROUP

New acquisitions and partnerships

The number of **Glass Group** affiliates has now reached 18. Glass Group is the first completely independent Italian group bringing together leading glass companies with decades of experience in the transformation of high quality insulating glass units around its brand. New entries, at the end of the first quarter of 2021, are the *Cappelletti and Roleri* glassworks in Piacenza, *Glastebo International* in Bologna, *Quidam* in Cairo Montenotte (SV).

"Glass Group's goal is to 'create a system' through synergies and strategic partnerships, effectively designing a large supply chain hub," said Daniele Predari, President of Glass Group. "We are pleased to welcome three new leading affiliates to the group such as Cappelletti & Roleri, Glastebo and Quidam. We believe their addition also constitutes an opportunity for growth for the whole group that will benefit from their expertise and their driving force and, at the same time, will guarantee them to grow, in terms of size, know-how and as a reference point for the flat glass supply chain."

The supply chain, in particular, is represented today by the glass factories, with which the group has a fruitful collaboration that has lasted for years. These include the main partners, the companies producing complementary products to glass for the production of double glazing *(Fenzi, Industrie Pellini, Technoform)* and the flat glass processing industries that are the driving force of the group. These companies managed to bring together actors who were linked by purely commercial purposes and who now share a common growth project. Glass Group is a 'laboratory' that examines economic and production challenges that all companies face in their supply chain, from the largest to the smallest.

Additionally Sapiens spa, an employment agency, joins the Glass Group as business partners, and their aim is to promote the employment of young people in the industries of the sector. With Sapiens Spa, Glass Group will collaborate in the creation of a training centre for specialized personnel to be included in the glass processing industries with the goal of allowing young people to be able to enter companies with adequate knowledge of the material and production processes. This is a project that has a double objective: on one hand to train specialized personnel by accompanying young people in the world of glass and on the other hand to respond to the needs of companies that increasingly need specialized personnel.

The group was formed thanks to the aggregation of five founders *(Mornagoglass Srl, Predari Vetri Spa, Vetraria Pescini Srl, Vetreria Romagna Srl, Vetreria Valfon Srl)* and today boasts 13 affiliates *(Aluvetro, Vetreria Lucana di Vetromat Srl, Vetreria Deserto Srl, Vetreria Biava, Podda Vetri Srl, Termovetro Sud Srl, Vitrum & Glass Srl, Vetreria Tacca Srl, Vetropadana Srl, Guidi Glass Srl* and – precisely – Cappelletti & Roleri, Glastebo and Quidam).

In the current economic context, the companies belonging to the Glass Group have joined together in order to restart with their EUR 100 million turnover, 22 factories and about 600 employees, which constitute a significant share of the Italian flat glass market, estimated at EUR 880 million.

WWW.GLASSGROUP.IT/EN/

HEGLA-TAIFIN

CTF-Series – high convection tempering furnaces

HEGLA-TaiFin introduces the CTF-Series high convection tempering furnace for flat glass.

HEGLA-TaiFin's CTF Furnaces' innovative modular construction enables unlimited product length with optimal and even heating/cooling capability for every size and thickness of glass. Powerful convection system enables production of all glass types from clear to coated low-E. User friendly and advanced control system makes production of various glass types easy and simple.

HTTP://TAIFIN.COM/HOME.HTML

VINCENT

New, independent organization

As of May 2021 **Vincent** has been restored as operative brand of the former Quartz Industries Division of the *Tyrolit Group*.

Vincent is the name of the company founded in Thiene, Italy, in 1974 that was incorporated into the Tyrolit Group in 1994. Since then, Tyrolit and Vincent brands have coexisted, giving life to one of the most important companies in the production and sale of industrial abrasives for the processing of Engineered and Natural Stone, Ceramic Tiles and Glass.

After nearly 30 years, Vincent has left the Tyrolit Group and returned to be an independent organization. Vincent is an authentic Italian excellence, capable of providing high quality products and services that meet the highest standards.

The Vincent organization, which includes production sites in Italy and Asia, with sales presence in various European countries and in North and South America, currently has over 300 highly qualified resources and a commercial presence in over 70 countries, serving more than 1400 customers worldwide.

Vincent will continue to serve its customers as before, except for the new logo now complemented by the "TOOLS FOR QUARTZ INDUSTRIES" tag line to emphasize its focus on those industries where quartz, the most abundant mineral in earth crust, is an essential component: Natural Stone, Engineered Stone, Ceramics Tiles and Glass.

HTTPS://VINCENT.IT

Vincent®
TOOLS FOR QUARTZ INDUSTRIES

CORNING

Grand opening of Gen 10.5 LCD glass plant in Wuhan, China

Corning Incorporated hosted an opening ceremony for its Gen 10.5 liquid crystal display (LCD) glass substrate manufacturing facility in the city of Wuhan in the Hubei Province, China. The facility is co-located with a BOE Technology Group Co., Ltd. (BOE) plant. With the successful operation of the plant, and the easing of restrictions in the region, Corning is commemorating this important step in building its presence in China and strengthening its relationship with an industry leader.

This high-volume manufacturing facility will allow Corning to deliver Gen 10.5 glass substrates, measuring approximately 3 meters wide by 3 meters high, directly to BOE for its production of large-size display panels. Gen 10.5 glass provides the most economical cuts for 65- and 75-inch TVs, which are expected to drive display-glass market growth over the next several years. The market for large-size TVs, defined as 65-inch and larger, is projected to grow at a double-digit compounded annual growth rate though 2024.

"Our decade of experience in G10+ glass manufacturing enabled us to apply the learnings and the technical know-how necessary to ramp this facility rapidly, even during the most challenging of times. Today's celebration is a testament to our deep commitment to support customer demand while ensuring the safety and health of our employees," said Chris Hudson, international division vice president and general manager, Corning Display Technologies China.

Corning began shipping production samples from the Wuhan plant in January of 2020 and achieved finishing line mass production by mid-2020, despite pandemic-related challenges. The Wuhan manufacturing facility is Corning's sixth LCD glass plant on the Chinese mainland and its second Gen 10.5 facility along with the company's Hefei plant in the Anhui Province, which opened in 2018.

John Zhang, senior vice president and general manager, Corning Display, said, "Our Wuhan plant is the most recent demonstration of Corning's commitment to China's display industry. We appreciate the support we have received from the Dongxihu District, Wuhan municipal, and Hubei provincial governments. With our advanced glass technology and skilled local talent base, we are poised to make even greater contributions to growth in the region."

WWW.CORNING.COM

OPTRIS

New inspection system for process control in glass tempering

With the new glass inspection system, temperature differences during glass hardening processes can be quickly detected, thus avoiding rejects and providing automatic quality monitoring.

The **Optris** Top Down GIS 640 R system with temperature referencing by means of a sensor from below as well as automatic emissivity correction for standard and low-E glasses was specially developed for process control in glass tempering machines.

Important specifications:

- digitally controlled lens protection system (DCLP) avoids extra air purging;
- glass area calculation;
- pre-assembled system for easy installation on glass tempering furnaces;
- automatic scan line adjustment – insensitive to distortions.

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VITRO GLASS

Bird-friendly façade for the University of Saskatchewan

Embracing a 'science-on-display' theme, the state-of-the-art Collaborative Science Research Building at the University of Saskatchewan in Canada delivers an integrated, sustainable environment for the school's biology and agricultural departments.

Decorated with stone columns to blend into the campus's Gothic style, the 72,118-square-foot building features floor-to-ceiling AviProtek® E bird-friendly, solar control low-emissivity (low-E) glass consisting of Solarban® 70 glass by **Vitro Architectural Glass** and acid-etched AviProtek® bird-friendly patterns by *Walker Glass*. In addition to protecting the school's thriving bird population, the glass showcases the work of researchers affiliated with the University's Global Institute for Food Security, who are devoted to pursuing developments related to drought-tolerant crops and pest-control.

Responding to the school's request that bird-friendly glazing be incorporated on all vision glass, Walker Glass recommended AviProtek® Pattern 217, consisting of bird-friendly, acid-etched visual markers on the exterior-facing surface of Vitro Glass's high-performing solar control, low-E glass.

Designed in accordance with the Canadian government's Bird-Friendly Building Design Standard CSA A460-19, AviProtek® Pattern 217 fulfils requirements that bird-friendly visual markers be placed on the exterior surface of the glass and at a minimum distance of 50 millimetres from each other. These two mandates make it easier for birds to see and avoid colliding with glass building panels and facades, regardless of lighting conditions.

Spandrels finished with colourful OPACI-COAT 300® coatings by ICD High Performance Coatings further enhance building design and bird safety. AviProtek® E glass also was specified for the pedestrian bridge and rooftop greenhouses.

Helping the building qualify for Green Globes certification, Keith Henry, FRAIC, SAA, LEED AP, a partner with Henry Downing Architects, said that insulating glass units (IGU) with Solarban® 70 glass were selected to reduce heat gain and maximize visible light. "Energy modelling was conducted to encompass all aspects of the building envelope, including airtightness for the curtain-wall," he explained. Flad Architects served as the design architect and laboratory planning consultant for the project.

One of industry's highest performing solar control, low-E glass, Solarban® 70 glass provides visible light transmittance (VLT) of 64% and a solar heat gain coefficient (SHGC) of 0.27 in a one-inch IGU with clear glass.

Walker Glass AviProtek® E glasses combine low-glass coatings by Vitro Glass with decorative patterns that birds can see in flight, enabling them to avoid collisions with windows and glass-walled building facades. The past year has seen a surge in legislation for bird-safe building materials in the U.S., Canada and around the world, including the Bird-Safe Buildings Act, which was passed by the U.S. House of Representatives in July 2020, as well as New York City's bird-friendly building materials law, which was enacted in January 2021.

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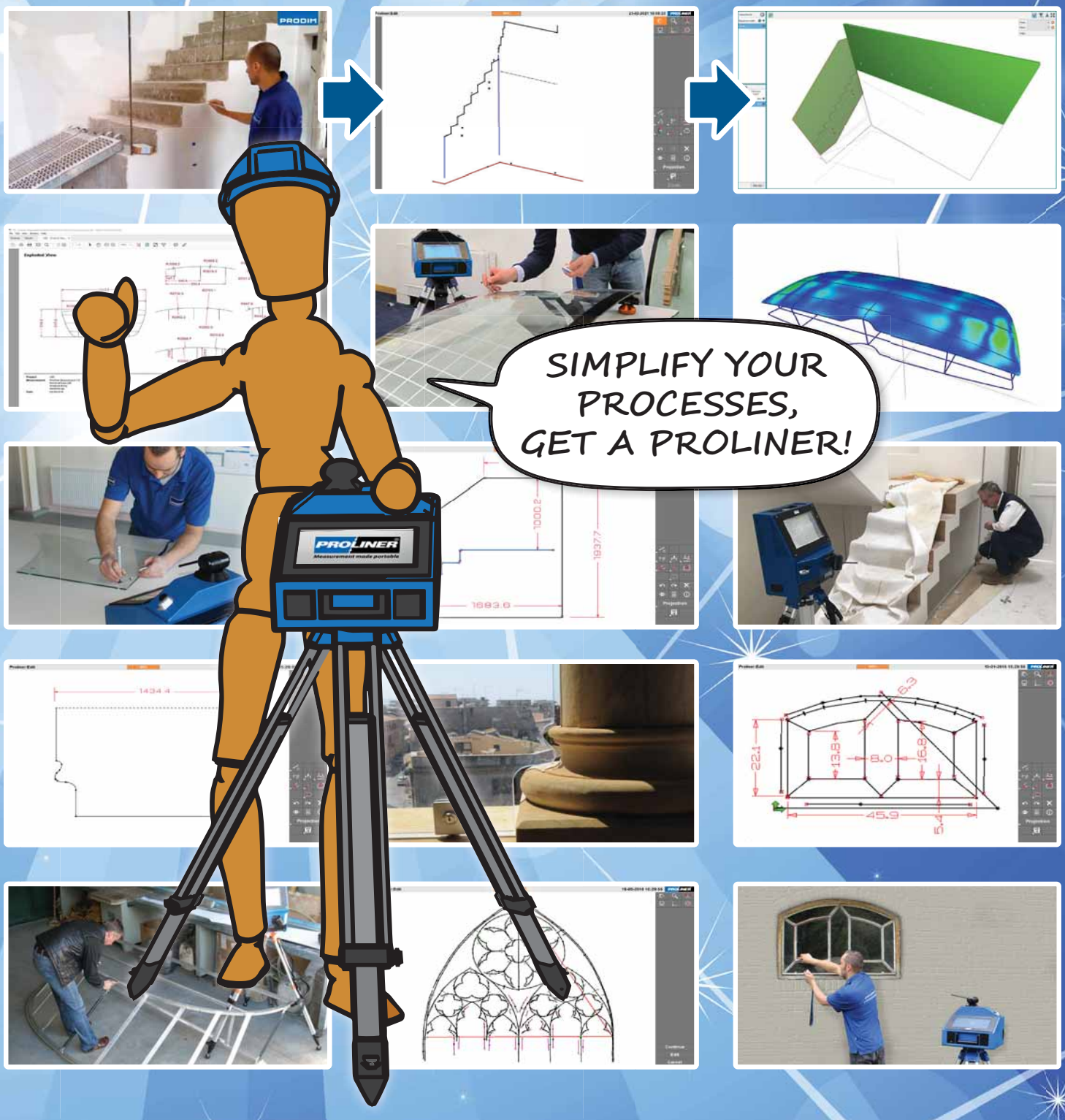

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TUROMAS launches the new RUBI 406VA

In this article, Turomas presents the first model of autonomous cutting table for six-metre glass, thus completing its range of machinery with automatic loading systems – the VA.

MORE AUTOMATION, MORE FLEXIBILITY, MORE SPACE

The innovative design of Turomas' VA automatic loading systems meets the loading, cutting and automatic unloading needs of the most demanding customers, ensuring maximum productivity and automation in the smallest possible space.
Since the first automatic glass loading system was launched in the 1980s, Turomas has continued to work on the improvement and development of this technology. Knowledge and experience that have allowed Turomas to become pioneers in launching the solution for loading six-metre glass from the cutting table itself.

The lack of sufficient infrastructure is a handicap for medium-sized glass processors, which is why it is essential to make the best possible use of resources, achieving the greatest possible coordination and efficiency in the plant.
In the new RUBI 406VA model, the automatic loader is integrated into the structure of the cutting table itself, optimising the loading, positioning, cutting and evacuation processes in just 35 square metres.
Solving the four processes in the same space means extensive economic and logistical benefits for customers. On the one hand, financial savings by not having to take on the cost of purchasing and installing an automatic loader. And, on the other hand, optimisation of the space in the plant by eliminating the

RUBI 406VA - 6m Glass Cutting Table

New TUROMAS loading system integrated in the RUBI 406VA cutting table

Four-tool integrated cutting system: 4TOOL

need for additional equipment to load the glass.

NEW LOADING SYSTEM: MORE ROBUST, MORE RELIABLE, FASTER

The loading arms have been redesigned and upgraded to incorporate a new instantaneous separation system that puts an end to the problems associated with the glass sheet separation process.

With this new design, speed and loading times are significantly improved, reducing loading time to a minimum without compromising safety in any way. The entire feeding cycle is carried out in a progressive and smooth manner, eliminating breakage due to collisions and the possibility of accidents.

In addition to the revolutionary loading system, the design of the RUBI 406VA has been specially reinforced to allow to cut glass of any thickness, to de-coat low-E, TPF and EASY-PRO® glass, and to label every single piece, guaranteeing high performance and cutting quality.

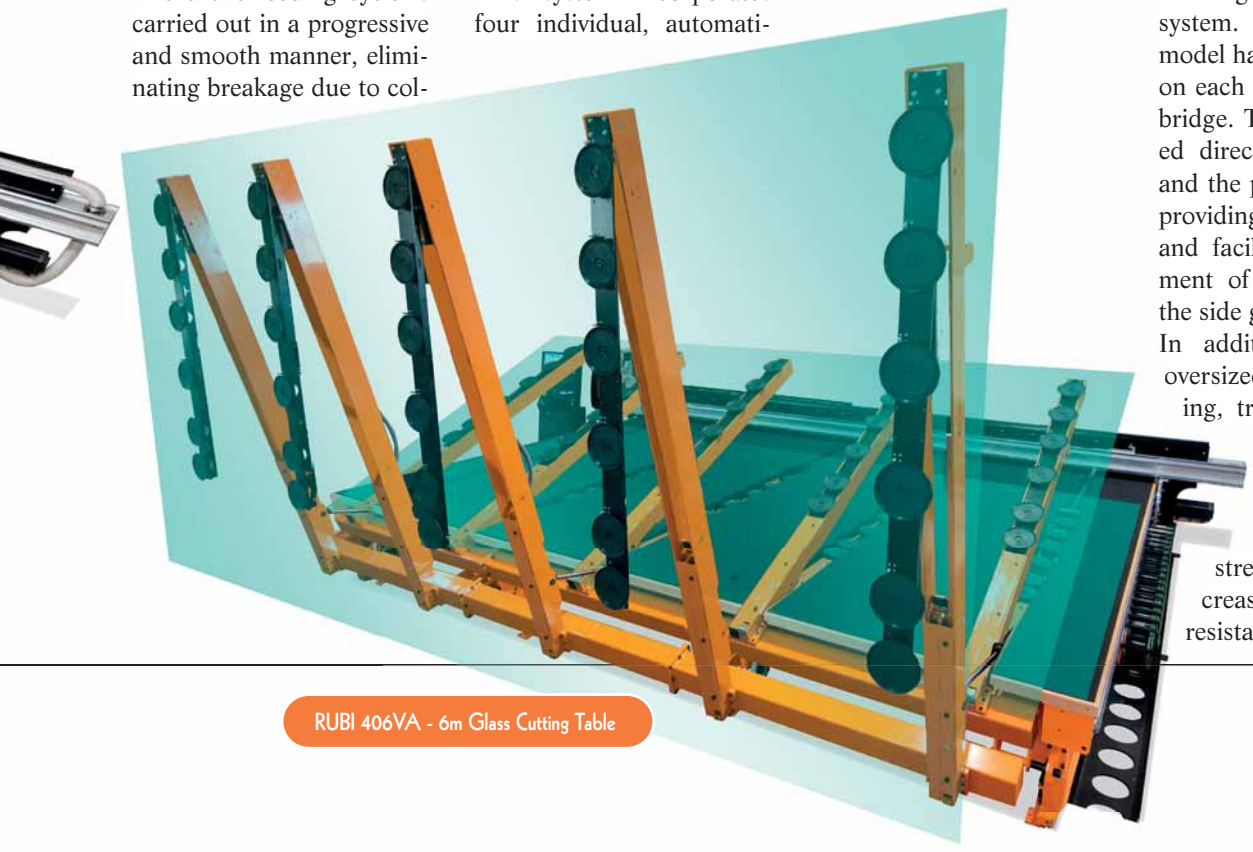
MAIN FEATURES

Among the main features that set it apart is the four-tool cutting head that guarantees perfect cutting for any thickness, including 25-millimetre thicknesses. This system incorporates four individual, automatically selectable cutting tools, each with its own cutting wheel, independent lubrication system and pressure cylinder specifically dimensioned for its cutting range.

The first tool is intended for cutting glass thicknesses from 1.8 millimetres to 2 millimetres. The second and third tools are used for glass from 2 millimetres to 12 millimetres, which are the most common thicknesses. The fourth tool uses a larger diameter wheel to cut glass from 12 millimetres, 15 millimetres, 19 millimetres, up to 25 millimetres.

Another aspect that guarantees reliability and precision in each of its movements is the gantry transmission system. The RUBI406VA model has two motors, one on each side of the cutting bridge. These are connected directly to the pinion, and the pinion to the rack, providing greater power and facilitating the movement of the bridge along the side guides.

In addition, it uses an oversized, self-lubricating, trapezoidal double-guided transmission system that prevents contact losses, withstands stress better and increases precision and resistance to inertia.



RUBI 406VA - 6m Glass Cutting Table

Cutting head, de-coating system and extruded aluminium bridge

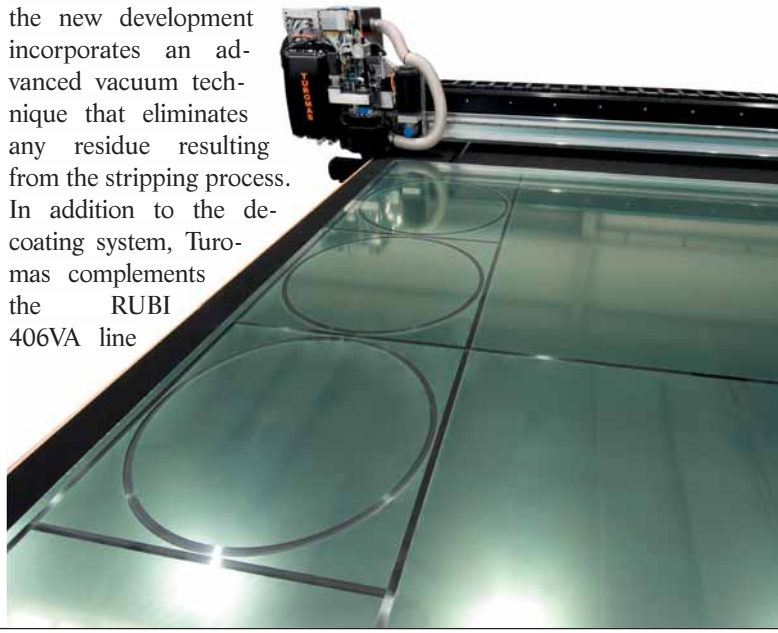
The cutting bridge has been specially designed by Turomas' engineering team, and is made of extruded aluminium, a lightweight material that allows greater speed and acceleration to be achieved. All its components, from the profile through the guides to the slides, are oversized to increase the useful life and support the weight of the tool, as well as the accelerations and inertias derived from movement.

It has a two parallel guideways system with a linear accuracy of hundredths of a degree that promotes smooth movement, reduces noise, increases durability and enables the motors to move larger loads.

OPTIONAL FEATURES

With regards to optional features, the RUBI 406VA model incorporates an innovative, high-performance, self-calibrating de-coating system for low-E glass, low-E glass with plastic protective coating (TPF) and EASYPRO®.

This system is able to remove the protective coating from the glass in a single pass, improving cycle time and reducing grinding wheel wear. In addition, the new development incorporates an advanced vacuum technique that eliminates any residue resulting from the stripping process. In addition to the de-coating system, Turomas complements the RUBI 406VA line



TUROMAS de-coating system for low-E TPF and EASYPRO glass

TUROMAS automatic labelling system

ing and cutting glass with up to 300 per cent higher throughput.

with an automatic labelling system of both glass parts and scraps. It is integrated into the cutting bridge and moves with the tool, resulting in high printing and application speeds.

The labelling system is extremely robust, making it immune to inertia caused by machine movement and acceleration. The labelling process can be carried out by contact or by blowing, so that 'coconut dust' is completely removed and the adhesion of the label is improved.

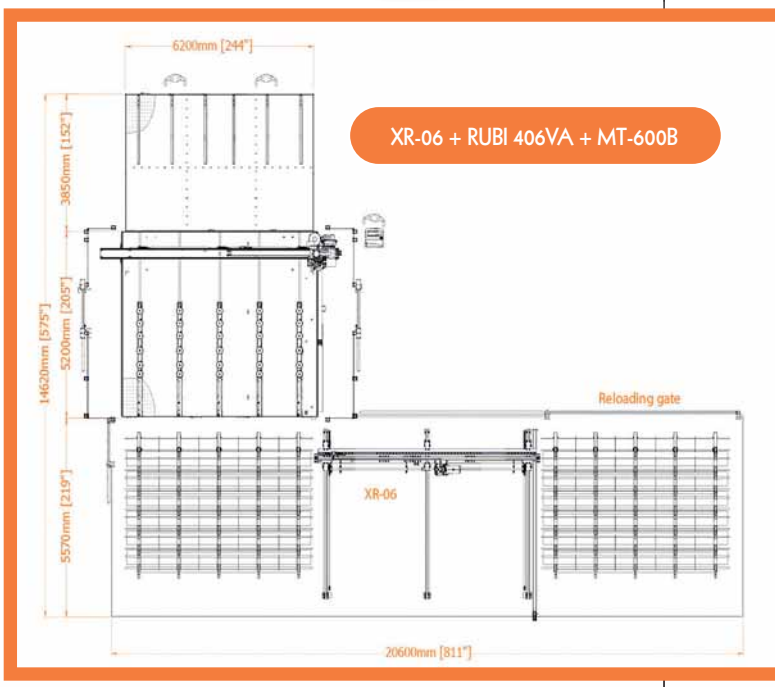
RUBI 406VA IN COMBINATION WITH SR – RACK SHUTTLE WAREHOUSES

The new model in combination with the Rack-Shuttle SR storage systems forms a production system capable of meeting the needs of the most demanding processors and, at the same time, adapting to virtually any space and type of glass.

This type of machinery has established itself on the market as the new intelligent storage system thanks to its flexibility, modularity and production rate.

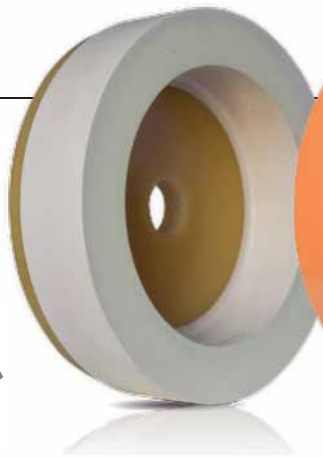
The RUBI 406VA, on the other hand, loads the glass sheets directly from the warehouse rack, optimising space and allowing the area not used by the automatic loader to be used to increase the storage capacity of the system.

The combination of the two machines offers a simple and cost-effective alternative for autonomously storing, load-



XR-06 + RUBI 406VA + MT-600B

XR-06 + RUBI 406VA + MT-600B



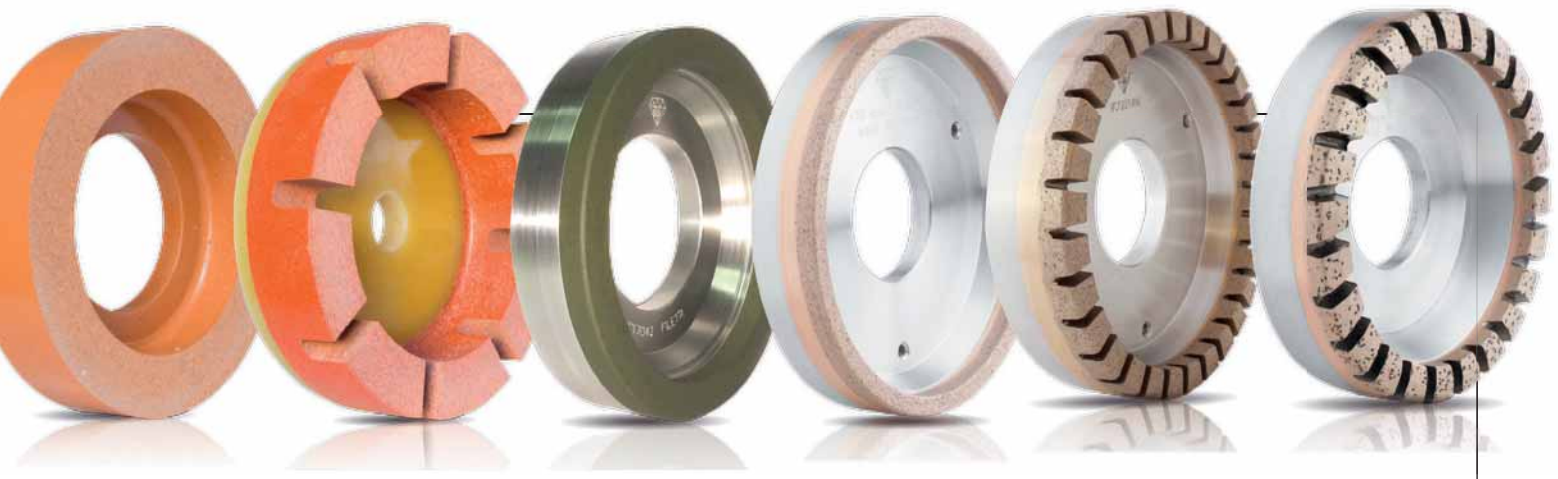
ADI, Made in Italy expertise at the service of customers

The Surfaces brand continues to stand out for its innovative, technologically advanced solutions that fit perfectly with the synergies of the group, while ensuring complete customer satisfaction with state-of-the-art innovations.

ADI is universally recognized in the glass industry as the benchmark for tools and accessories for working both flat and artistic glass. Its reputation, built over 40 years in business, is a testimony to the level of experience and expertise gained across a wide range of tools, including both standard products and solutions specifically designed to solve the needs of every customer. With its state-of-the-art innovations, ADI ensures that complete customer satisfaction is always at the centre of everything it does, and always with a view to minimizing Total Cost of Ownership (TCO). It always provides the best performing solutions in terms of results and process: an ADI tool fits perfectly into production lines, guaranteeing the highest performance, and positively influencing overall production.

Minimizing TCO is the key to customer satisfaction, deciding to invest more in a tool with a final cost that is significantly lower than that of other items in the process that benefit from it:

- raw materials, with yields that are better protected by the use of quality tools;
- reduced need for operator intervention to bring the processes back to their initial parameters;
- better manage-



ment of the system, with significantly less downtime and maintenance.
The reasons for ADI's success are explained by planning, production and total control over raw materials, entirely centralized design, development, implementation and testing processes. 'Made in Italy' excellence which has built up its highly-regarded competence over the years by ensuring that all operations are aimed at satisfying the customer in a timely manner.

ADI WHEELS FOR CNC MACHINES

The grinding wheels for vertical and horizontal CNC machines, and UHS® grinding wheels, fit perfectly into this perspective. In fact, they guarantee the improvement of the entire process, ensuring constant high quality over time, reducing waste and machine downtime. The result of these interactions is precisely the minimization of Total Cost of Ownership.
CNC machine wheels continue to conquer important market shares, becoming the key players in the purchasing choices of manufacturers, and acknowledgment from the main reference markets is significant. From Western and Eastern Europe to the United States, companies that process flat glass are choosing these wheels to improve their standards.
UHS® wheels, equipped with exclusive technology, process the edge of the sheet perfectly, and maintain their original profile for a long time, even under heavy stress and with high production intensity.

ADI-RBM: CUP WHEELS FOR WORKING AND POLISHING EDGES

Perfectly integrated within Surfaces Group, ADI and RBM Italia represent the Group's Glass Business Unit.
The two historic companies, principle players in the supply of tools for processing and polishing flat glass, have chosen to coordinate their respective R&D activities and though this have developed efficient and performing application technologies for edge processing.
Taking from what already exists in other Business Units of the Surfaces Group, ADI and RBM have also established their own testing laboratory with internal resources completely dedicated to this project.
Exclusive and highly customizable solutions that support the needs of each customer and provide the perfect sequence of wheels for use on both straight and double-edging machines.
A truly integrated system that can be optimised according to the type of sheet, from the thinnest to the maximum thicknesses allowed by each machine.
The standard range guarantees an extremely wide range of diamond and polishing wheels, in various compositions, grain sizes, bonds and structures.
There is an ideal combination for every need, giving an impeccable qualitative result, and above all supporting the customer's production process, offering the best performance in terms of speed, duration, efficiency, stability and consistency.

GLASSRENU, FOR PERFECT SHEETS EVERY TIME

ADI's sphere of operations in the construction, automotive, ship refitting and street furniture sectors is experiencing a fitting development due to the distribution and implementation of the GlassRenu system. This exclusive patent is marketed by ADI all over the world, with the exception of the United States where it is distributed by IGP Tools, a US branch owned by ADI and belonging to the Glass B.U. of Surfaces Group.
GlassRenu allows the restoration of glass surfaces damaged by marks, lines or scratches. Wear, weather, vandalism or installation defects can really jeopardise large windows in buildings or shops, car windows, glass on ships and yachts. Replacement is often very difficult, given the considerable size and thickness of the sheets, and of course, extremely expensive. GlassRenu however, allows work directly on the glass in site.
The dry operation is extremely clean, and allows the damaged surfaces to be returned to their original perfection without risk, as it excludes the need for disassembly and reassembly. The scaling system, which can also be used on curved surfaces, modulates the action based on the extent of the damage,

thus reducing waste and significantly reducing recovery times and costs.
ADI's expertise is again at the service of customers to provide not only a product, but a truly complete and customized system, developing a specific solution and also providing tailor-made training courses on the use of GlassRenu.
Technological excellence, the capacity to really listen, outstanding competence, products and processes entirely 'Made in Italy': in all its operations and services, ADI's knowledge is made available to every customer, with advanced solutions always guaranteeing the minimization of Total Costs of Ownership. The policy that encompasses the philosophy of the entire Surfaces Group.

Adi Srl

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INDUSTRIAL DIAMOND APPLICATION
SURFACES GROUP

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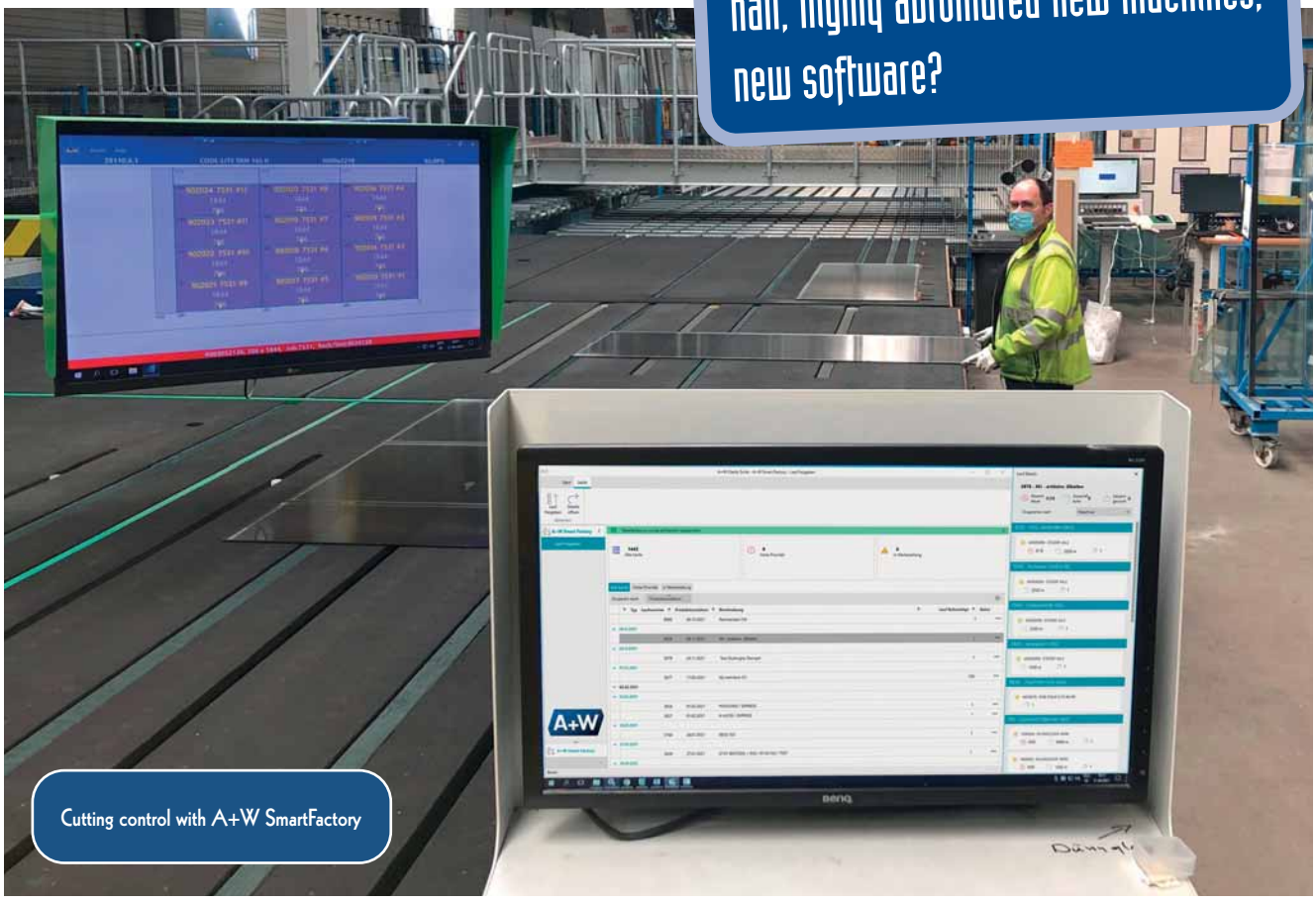
A+W SmartFactory controls high-tech glass production

When moving Vetrotech production from Aachen to Würselen, Germany, A+W implemented one of the most demanding software projects in its company history. Would it work? New hall, highly automated new machines, new software?

Guido Plum, Operational Director at Vetrotech: "The construction of automated production in Würselen was a challenge for all participants, for what we were planning had never been done in the 20-year partnership between Saint Gobain and A+W. For the software, we relied on A+W, even though we knew that a brand-new system would



Cutting control with A+W SmartFactory

Guido Plum, Operational Director Vetrotech

be used – fair and successful cooperation on a level playing field across two decades, and A+W's sophisticated SmartFactory concept, made the decision easy for us."

Today A+W SmartFactory, a state-of-the-art production system, automatically controls the highly complex production of fire protection and safety glass in Würselen.

CONTROLLED BY INTELLIGENT SOFTWARE THROUGHOUT

For the first time, multi-level production with backward planning is controlled by intelligent software throughout – without paper, lists, and long routes to travel – based on an A+W patent with an automatic sorter before and after the tempering furnace. Even now, the new system ensures faster throughput times, which is especially clear on the TPS insulated glass line, in LAMI production, and on the tempering furnace.

A+W SmartFactory is the top-level production system that coordinates the process flows for an optimized glass flow. The system is in a position to responsively control all coupled machines and software modules with the production data provided. Machines communicate constantly with the system via so-called A+W SmartFactory clients; this enables the control of machine status and machine capacity.

According to the principle of backward scheduling, the dispatch requirements and thus ultimately customers control the production sequence. Planning is done in real time and can be adjusted at any time in the future if this should be necessary for rush orders, capacity bottlenecks, machine failures, etc.

Dennis Tiegs, COO A+W Clarity: "The special thing about A+W Smart Factory is the scalable deployment, which helps the smaller operations to become large and the large operations to automate further! The advantage of the lean production approach is taken here right from the start.2

Dispatch generally doesn't even notice this, so it's almost always possible to make on-time deliveries. Vetrotech customers profit from improved performance and delivery reliability.

The intelligence required for this lies only in the software that controls the communication between machines, and also between machines and human beings: a new industry standard on the path to Industry 4.0, which is optimized constantly by the expertise that flows from our pilot customers.

The implementation phase went very well thanks not least to the engaged commitment of the Vetrotech project group. With enormous efficiency, they tackled the project together with the A+W planners, bringing it to a successful conclusion.

Guido Plum comments: "Despite the problems that are inevitable in such projects, the implementation phase created a win-win situation. We got to know the new software in great detail – our compliments to our colleagues at A+W, who helped with the project on-site! At the same time, we were able to shape and improve A+W SmartFactory with our specialized knowledge from the very beginning – to the benefit of both sides."

LESS-AUTOMATED COMPANIES: THE OSBY GLAS PROJECT

If there are no possibilities for direct machine com-

The performance of the LAMI production has increased significantly thanks to the use of software-controlled sorters: practical effects of clever automation.

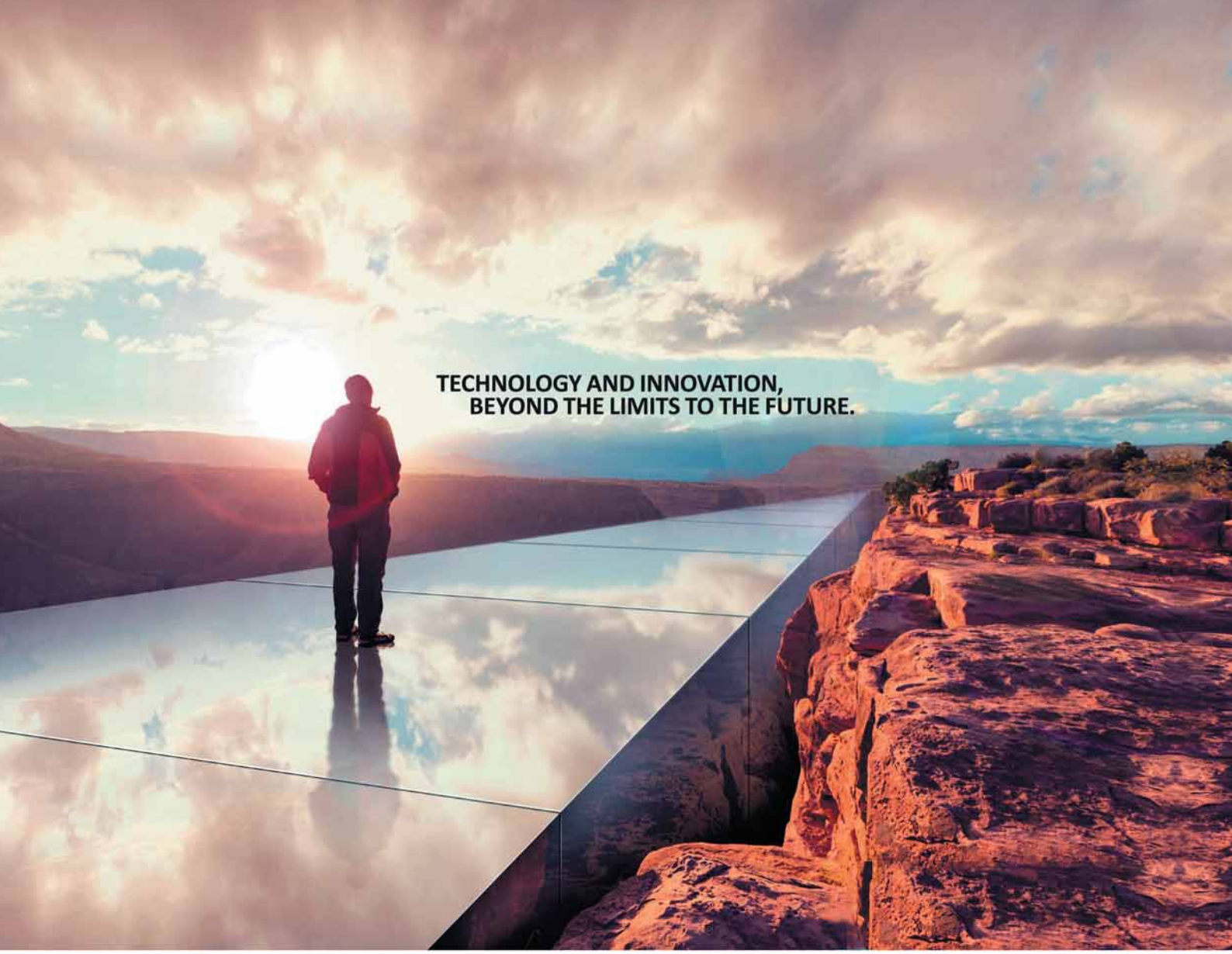
In less automated production, A+W SmartFactory controls the employees' activities first and foremost.

munication, A+W SmartFactory clients function as imitation machines that can determine status and capacity per machine thanks to the integrated plant data collection. A control center provides the production manager and the general management with a wide variety of information from A+W SmartFactory, and if necessary, allows them to intervene directly in production, e.g. with the manual adjustment of production chains.

This way, even less-automated companies can profit from this development. First and foremost, in such production facilities, A+W SmartFactory regulates employees' activities and informs in real time about necessary production steps and changes to the production process. Here too, precisely that is produced what is needed first in dispatch; rush orders are integrated without a problem, WIP (work in process) is reduced a great deal.

The Swedish insulated glass manufacturer Osby Glas pilots this variant of A+W SmartFactory, which eliminates paper in production and guarantees shorter delivery times. Joel Rosenqvist, CEO of Osby Glas: "We have been working with our software partner A+W for many years. In this time, we have worked together to implement many innovations that have made our processes better and better. That's why we're happy to pilot the new production software A+W SmartFactory and we believe that it can make Osby Glas still more successful. We're proud to be able to use our knowledge and experience to contribute to the enhancement and continuous improvement of this software."

Joel Rosenqvist (right), CEO Osby Glas; Pontus Levin, A+W Director Sales North-East Europe – EMEA/APAC.







TECHNOLOGICAL MACHINES FOR WASHING, STOCKING AND CUTTING OF FLAT GLASS

SOLUTIONS FOR WASHING:
vertical and horizontal washing machines for low-e glass

SOLUTIONS FOR GLASS STORAGE:
manual, semiautomatic and automatic storage systems

SOLUTIONS FOR CUTTING:
manual, semiautomatic and automatic cutting tables for float and laminated glass

SOLUTION FOR GLASS HANDLING:
automatic loader and unloaders, clamps, vacuum lifters, manipulators

SOLUTION FOR PROCESSING:
CNC Milling machines, vertical drillers

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Improved workflows and greater flexibility, with HEGLA space-saving storage

Hegla introduces its KPL storage systems in this article in both manual and automated versions. With features such as compactness and flexibility, can all be customised to satisfy individual customer needs.

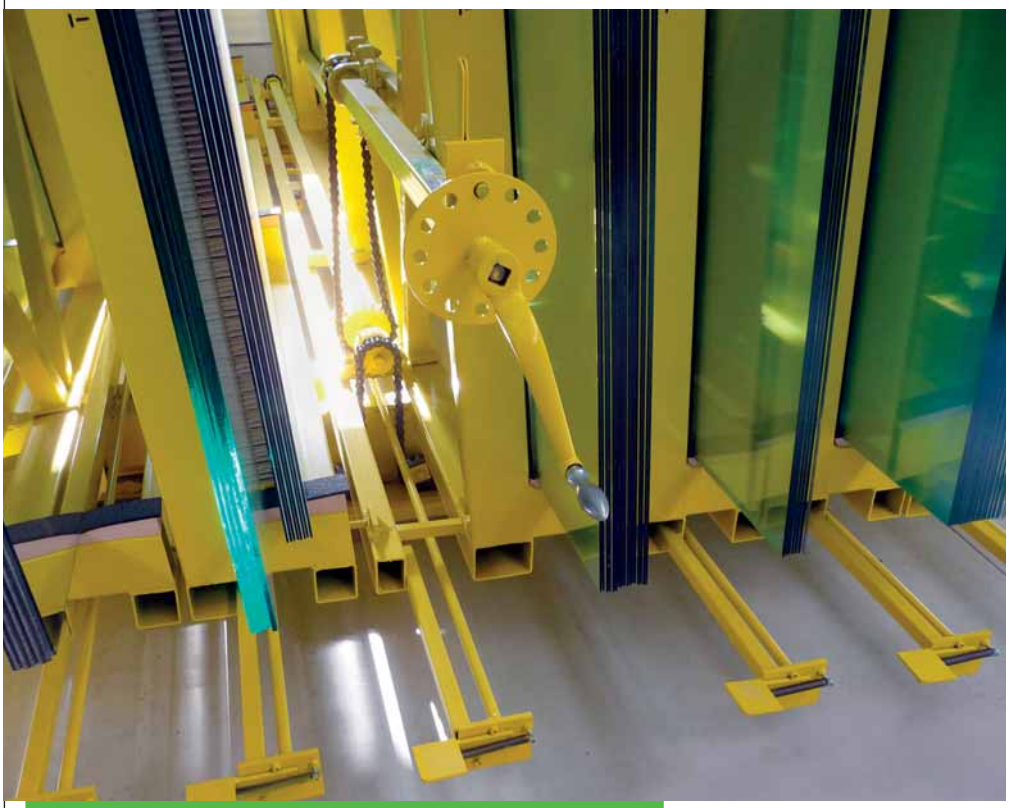
Manual compact storage system for glass. Operators can easily move individual storage racks as they are on a special track system

With direct access to additional types of products and lower handling costs, a compact storage system for glass contributes to improved workflows and greater flexibility. The individual storage positions are mounted side by side on rails to save space. For removal, an opening is created either manually or automatically so that the glass can be removed quickly without prior re-sorting.

MORE RACK POSITIONS AND DIRECT ACCESS TO DIVERSE PRODUCTS

In comparison with a conventional warehouse with A- and L-racks, compact storage systems can increase the number of rack positions many times over. Smaller compartments offer the option to store a greater variety of products. Larger storage positions have the space required for accepting larger quantities of one type.

Be it manual, motorised or wireless-controlled – compact storage systems can be harmonised to satisfy individual customer needs. The KPL-MZ manual storage system was designed for companies that require smaller quantities and a greater variety of products. It is also suitable for the provision of panes in special cutting. To remove glass, operators use a crank to create an opening that enables safe, scratch-free removal. For even greater operating convenience, faster processes, and additional storage capacity, HEGLA offers a wireless motorised variant: the KPL-F. Handling openings are triggered via wireless confirmation and, to save time, are possible directly after removal.



Storage compartments are moved smoothly with manual drive

INTEGRATION OF AUTOMATED LOADING

With the KPL-A automated storage system, you attain maximum automation and integration into your processes. Fully networked and integrated into the production software, all processes are system-controlled, motorised, and precisely harmonised to the glass flow. The storage positions are located to provide quick access to loading. On the one hand, they increase the variety of products in the glass storage system and, on the other hand, they enable additional sizes to be stored.

Wireless motorised compact storage system for glass. The handling opening is opened via motor – the storage rails can also be embedded in the floor, depending on customer requirements

EASY STORAGE MANAGEMENT AND INVENTORY OVERVIEW

If the glass storage system is supplemented by a HEGLA-HANIC storage management software or the Shop-Floor Assistant app, an accurate inventory overview is ensured at all times. You will be able to track which glass has already been reserved for production and whether or not more panes have to be ordered or your material procurement department has already ordered them – all in real time.

DURABLE CONSTRUCTION, UNLIMITED SCALABILITY

HEGLA glass storage systems feature robust movable rack nesting, which makes them particularly low-maintenance, torsion-resistant, and durable. Their modular construction enables you to flexibly adjust to the production requirements and glass dimensions of a production facility.

Hegla Gmbh & Co. Kg

HEGLA

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glass technology

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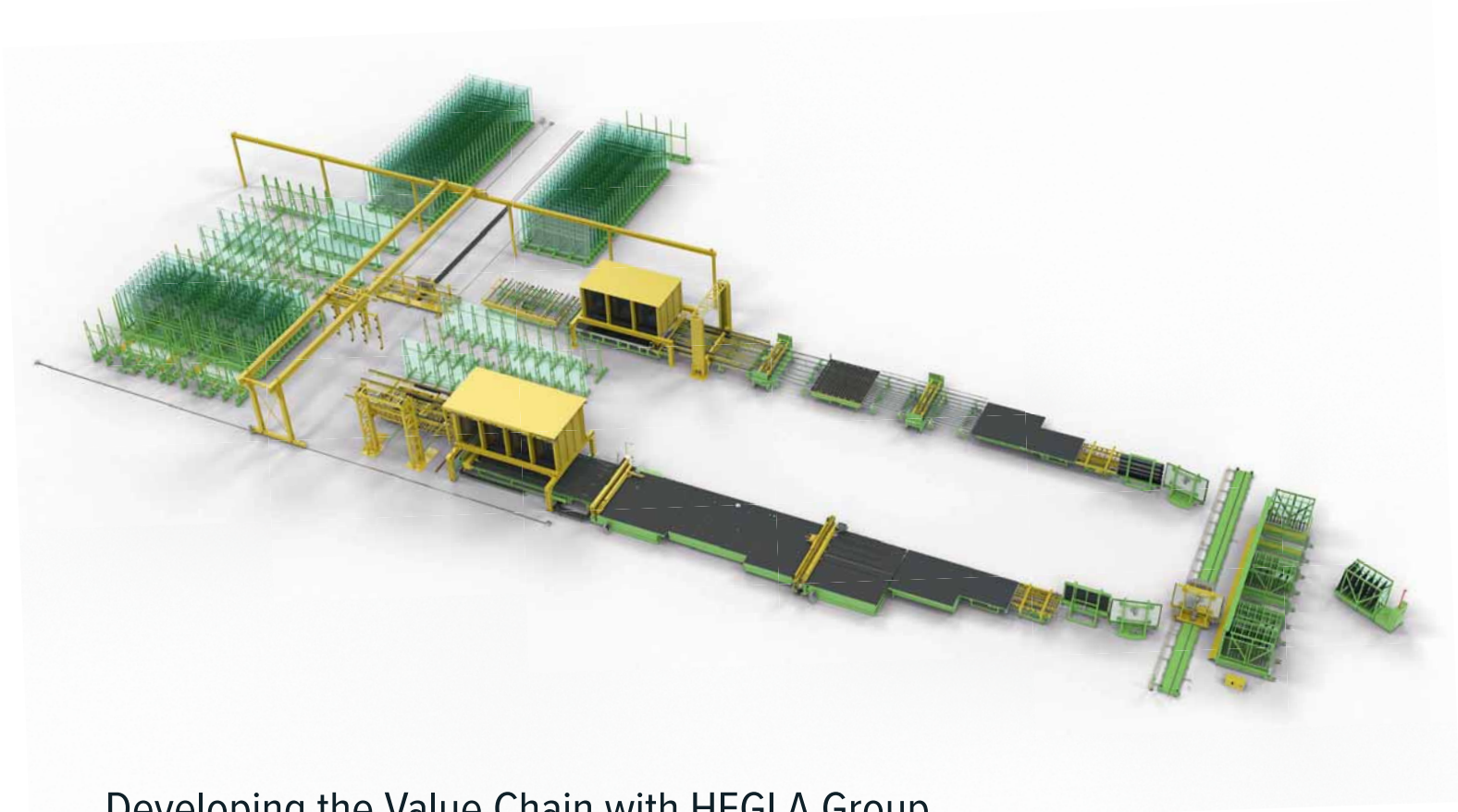


Developing the Value Chain with HEGLA Group

With machines and systems from HEGLA, you can achieve maximum precision, quality and automation. Efficient and modern software solutions from HEGLA-HANIC optimize your production control and planning. Innovations such as laser-assisted glass finishing and gentle laser marking from HEGLA boraident further increase your added value. The high-performance tempering furnace technology of HEGLA-Taifin offers you optimum production results for maximum customer satisfaction.

HEGLA boraident LASER-NANOTECHNOLOGIES IN GLASS

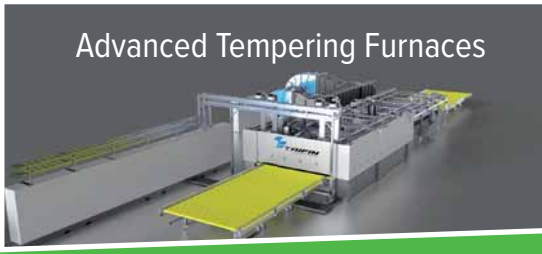
HEGLA HANIC

HEGLA TAIFIN

Upgrading Glass Products

Robust Software Solutions

Advanced Tempering Furnaces



HEGLA • Industriestr. 21 • D-37688 Beverungen • E-mail: info@hegla.de

hegla.com

RCN revolutionizes the lamination process

GLASS TECHNOLOGY INTERNATIONAL: Tell us a little about yourself, your professional growth and role in the company, and we will then move on to your new and important project...

Davide Ricchi, RCN: I can say that I truly grew up in our family glassworks. My mother and my grandfather always took me with them to the company, and my grandfather actually taught me how to cut glass.

When we went on to create the company manufacturing machines for glass, I was always there in the company, without being involved at the beginning, but even before finishing my studies, I started to really take part in company activities. I started with machines that were quite 'high-tech', which used software for the elaboration of laser cutting and engraving.

From then on my future was clear but, just like any newcomer to a company, I had to start 'from the bottom', learning the work, which, in my case, involved all aspects and departments regarding machinery construction. This included welding, assembly, a little part of electronics, up to my present role – which is the management of office activities such as Customer Service and Assistance, R&D, especially with regards to this new technology we are presenting in this article.

My main role, of course, is to assist and work alongside my mother Elena Calvi, owner of the company.

All this learning phase, combined with my studies – Scientific and Technological Lyceum – and my interest in physics and chemical aspects of products, has allowed me to develop this new product, which guarantees a type of lamination with 100 per cent excellent results on glass with clean edges,

GTI: What is the name of this new product?

Davide Ricchi: The name that we have given to this product is RD Clean

During a recent visit to RCN, we spoke to Davide Ricchi, one of the owners of the company, to find out about the most recent development in terms of glass lamination, which has already started to shake up the sector.

Davide Ricchi
RCN Solutions

Clean Concept

Concept System, where, much to my embarrassment, the first two letters are my initials, as an acknowledgement of my work and efforts.

GTI: Let's take a look at the reasons and problems that led to the development of this product and how this new product solves these problems,

Davide Ricchi: First of all I would like to say that RCN has changed its way of working over the past few years, also with regards to advertising, customer service and assistance. This has become even more evident during this past year of lockdown.

A fundamental question that we asked ourselves was: "How can I help and assist my customers when I cannot be there with them physically?"

The development of technologies that could make our customers' work the easiest possible without difficulties that we would not be able to solve without being present physically at the customers' premises became a priority.

We therefore developed this technology during the lockdown period to solve what we could define as a 'taboo' in the laminated glass sector: the cleaning of glass edges after lamination.

As we all know, the plastic materials that are used when laminating two sheets of glass, must guarantee a certain level of solidity and adhesion after undergoing the laminating phase in the furnace. The excess EVA film that leaks out from between the two glass sheets also creates the same type of adhesion externally. This external adhesion leads to a great waste of time to clean the glass edges to ensure the quality that the end customer requires from laminated glass.

We calculated how much time was needed to clean all the edges of laminated glass sheets in glassworks to make them acceptable as far as quality is concerned, and the results were that four hours of work were required for each single-level furnace load. It's clear to see that our technology has reduced production and labour costs, while guaranteeing perfect results.

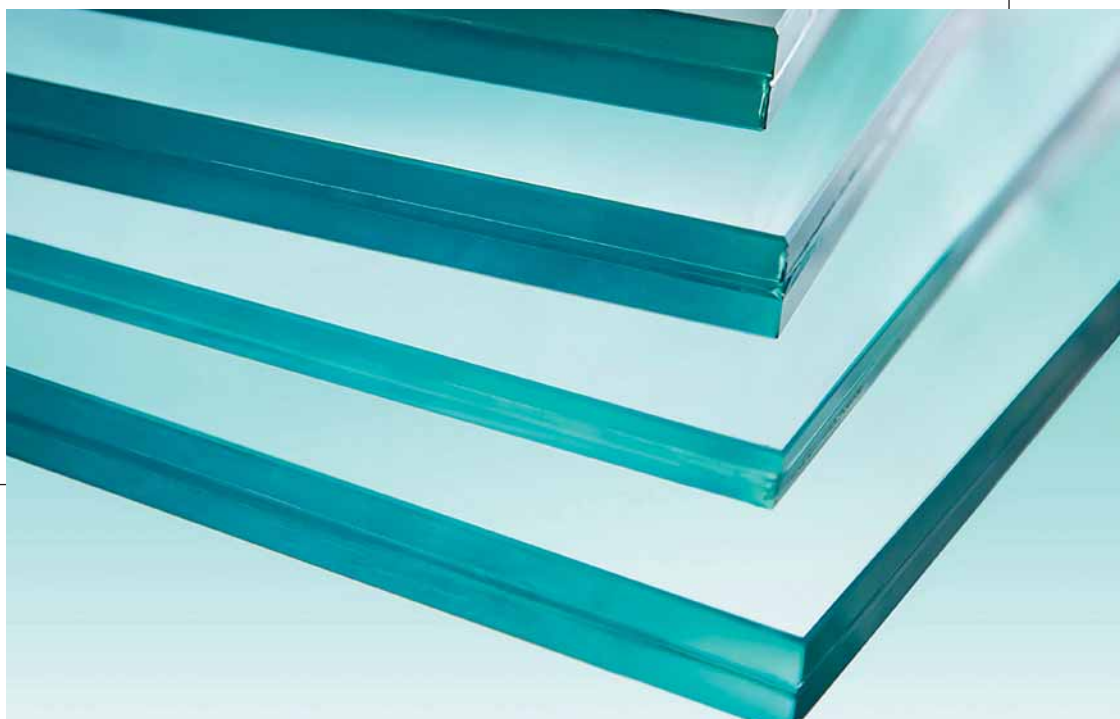
GTI: Are we speaking about chemical action?

Davide Ricchi: Part of the process is chemical and part physical. Here at RCN we maintain our procedure – which is part of our company philosophy – and is that of maintaining the vacuum level inside the bags at the highest level. This is because we believe that reducing the vacuum pressure means that we are allowing air to enter the bag, which reduces the vacuum pressure. This is extremely damaging for glass that has already been processed.

The process that this product carries out is also physical, blocking the leakage of EVA. The composition of this material has undergone physical and chemical changes. Some components are rigid while others have been chemically modified and are extremely flexible. This guarantees the specific composition of the product and, in turn, guarantees a certain type of phenomena that RCN has patented.

GTI: Does this involve a change in the bags, furnaces, and components inside the bags that are used?

Davide Ricchi: We would like to highlight a fundamental aspect. For RCN, changing the structure of EVA film once the highest adhesion has been found, would create considerable damage. This is because continuing to modify the chemical composition of EVA means not taking into consideration or not being able to foresee the possible damage that could occur over a period of 20-30 years with regards to delamination, bubbles, and the ageing of the material. EVA, in fact, must withstand all types of weather conditions. This means that the composition of EVA film must be that of the highest adherence possible. This is clear to see on the edges of the laminated glass: if the edges are easy to clean it could mean that adherence is not so good, also inside the glass sheets. What we have actually modified is the blocking of the leakage of this EVA film



with extremely high adherence from the glass edges.
Following our philosophy here at RCN of working to satisfy the needs of our clients, we have created a system that does not involve changing the furnace, but involves only adapting existing systems with an additional optional device.

GTI: So we are not speaking about an evolution of new furnaces, but also about installation on existing ones?
Davide Ricchi: Yes, and this is an important advantage for our customers, and involves interventions on the vacuum systems. This is because the vacuum pumps must have a certain level of power and torque, while the bags are substituted by our new 'product'.
An important fact to bear in mind is that any application of our system in the glass industry regarding testing and duplication of products is covered by an RCN patent.

GTI: So this means that if I have bags that are not supplied by RCN I cannot use them?
Davide Ricchi: If they work in the same way and for the same scope they cannot be commercialized.

GTI: Can your system be installed on furnaces and components from a competitor?
Davide Ricchi: Yes, RCN can install the system on competitor furnaces. This is what we are carrying out right now on the orders that we have received.
This technology has a number of advantages, starting from savings in labour costs, up to aspects regards standards to be respected with regards to quality. An example is UNI 12543, which concerns the quality standards of laminated glass.
Our new system also allows to laminate very particular materials such as polycarbonate materials which undergo deforming during lamination, guaranteeing flatness.
Another advantage is that even when adding a number of EVA layers – we have carried out tests on six layers – there is no leakage of EVA from the edges of the glass, and, therefore, there is no need to clean the glass edges at the end of the lamination process. In fact, the comment from most of our clients is that the glass processed in this way can be installed directly without needing any other work.

GTI: So this is not affected by the thickness of the glass being laminated?
Davide Ricchi: Absolutely not. Multi-layers – so not just two sheets of glass – but also 10+10+10 – up to 100mm, with guaranteed results.

GTI: Tell us about the orders you have received regarding this new development.
Davide Ricchi: We started with a 'pilot' client' glassworks here in Italy, who tested the first bag for us with regards to durability. This same pilot client has now bought a new machine with four levels – all with this new RD Clean Concept System.
We then started to advertise the product which resulted in a great deal of curiosity from the glass market – from the US first and foremost – and this is where our very first client is based. In fact, glassmakers there want to use our product for lamination in autoclaves with our silicon bags.
Of course, we also promoted our product on the Italian market with our clients here, and 50 per cent of the orders are, in fact, from Italian clients. The remaining 50 per cent are from Europe: Spain, Portugal, France, countries with a high level of laminated glass production.
And even if we started to advertise this product only a couple of months ago, we have already received about 15 orders in just one week! These 15 orders are for the modifications to furnaces and the supply of bags.
It's important to say that the production of our furnaces and bags are carried out simultaneously and do not interfere with each other. This important growth and development is really satisfying – especially in this difficult period.
And we know that this new type of laminating bag will, in the future become a part of the standard equipment of glassworks all over the world.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Limitless possibilities: new hub structure at LiSEC

Competent. Innovative. Reliable: And very important: close to the customer. With the new hub structure, LiSEC is breaking new ground with its international subsidiaries and literally opening up 'limitless' possibilities in sales and service matters.

MORE PROXIMITY TO THE CUSTOMER THROUGH LISEC HUBS FASTER. MORE EFFICIENT. MORE EFFECTIVE

"With its worldwide network of offices, LiSEC has always been close to the customer. In accordance with the market size and the installed machine stock, there are naturally also smaller branches in this network. In the smaller branches, however, it is only possible to maintain the service resources and the know-how required for the large number of products and solutions in order to be able to meet the support needs of the customers directly from the branch to a limited extent. Therefore, for more difficult issues, the support of the service centre in Austria must always be requested. Due to what is often a time difference

of several hours between customers' home countries and Austria, due to travel times for technicians that may be necessary, but also due to language barriers and the longer distances through the organisation, support for customers in these cases is sometimes not as quick and as flexible as customers expect and as we want to guarantee in any case," Gottfried Brunbauer, CEO of the LiSEC Group, describes the considerations that led to the optimisation of the branch office structure.

In order to focus even more on customers and their needs in the future, LiSEC is revising its branch structure in line with the cornerstones of its corporate strategy and optimising the structure for customers. The major change is that LiSEC is expanding individual branches worldwide into so-called focal branches or hubs, each of which is responsible for a specific market region. These hub regions cover the entire global market. Accordingly, more resources and more know-how can be pooled in the focal branches or hubs, and the coordination of after-sales activities in particular for a flexible and rapid response will be increasingly carried out by these focal branches in the future.

The remaining branches are coordinated by the respective hub in whose region they are located; administrative tasks and management activities are pooled in the focal branches as far as possible.

The central organisation in Austria is of course still available as a backup for demanding solutions at any time, but due to fewer time differences, shorter travel distances for technicians as well as fewer language barriers and shorter distances through the regional organisation, many more issues can be solved flexibly and quickly through the regional organisation than before.

CONCENTRATED KNOW-HOW AND RESOURCES

From the new focal branches, the entire region will be supported in sales and ser-

vice issues. However, this structural change not only improves the proximity to the customer, it also makes communication channels shorter and more efficient – response times are shortened and faster and the speed of solutions for customers is increased.

"Through the new structure, the knowledge required for professional, even more technically sound customer advice for the sales process will be made available increasingly in the regions. On the one hand, this is done by our own employees as well as a close cooperation network with agents to support the different national languages and to look after markets with less continuous demand," says Christian Krenn, Director International Sales at LiSEC and also responsible for the sales activities in all branches worldwide.

Dr Roger Hafenscherer, Director International After Sales Service at LiSEC and responsible for the installation, start-up and service activities worldwide and in all subsidiaries, regarding the changes: "Fast, uncomplicated, high-quality help and ideally in the respective national language – that is what our customers expect and also get.

Implementing customer projects professionally or meeting their needs as best and as quickly as possible was what originally prompted me at LiSEC to first develop a hub strategy for after-sales service. In a second, logical step, we then fully integrated sales into this concept in order to serve our customers and any interested parties in the same, efficient manner on the sales side as well, thus ensuring the advantages of the hub concept for our customers worldwide in all aspects. It is only possible to offer customers an 'All-round stress-free package' if the entire organisation works together. I am very pleased with the implementation of the first hubs and the improvements achieved, but I also believe that the full increase in performance towards our customers will only come to fruition gradually over the next few months. This is not least because we will be going through a certain learning curve with the improvements in internal business processes that this will bring about. However, the goal of focusing even more clearly on our customers reinforces our motivation – in line with the motto 'Rock our customers'!"

In total, LiSEC's branch structure will comprise six regions in the future; due to the geographical expansion of the China, South-East Asia, Oceania, Australia and New Zealand

LISEC

LiSEC, with its headquarters in Seitenstetten/Amstetten, is a globally operating group, and has been providing individual and comprehensive solutions in the area of flat glass processing and finishing for over 55 years. The service portfolio comprises machines, automation solutions and services. In 2019, the group, with around 1,250 employees and over 25 locations, generated total revenues of around EUR 224 million, with an export rate of more than 95 per cent. LiSEC develops and fabricates glass cutting and sorting systems, single components and complete production lines for insulating glass and laminated glass fabrication as well as glass edge processing machines and tempering machinery. With reliable technology and intelligent automation solutions, LiSEC sets standards in quality and engineering and significantly contributes to the success of its customers.

region, there will be two and thus a total of seven focal branches or hubs in this region:

- NWE: North Western Europe (Hub: Germany);
- SAL: Southern Europe/ Africa/Latin America (Hub: Italy);
- CIS: CEE/CIS (Hub: Poland);
- NAM: North America (Hub: USA);
- COS: China/SEA/Oceania (Hubs: China and Australia);
- MEI: Middle East/India (Hub: UAE).

Austria, Hungary, Israel and Japan will continue to be serviced directly by the head office in Austria.

With this change, LiSEC will continue to work in the usual way to remain the reliable, competent and innovative partner for flat glass processing it has always been.

TOPIC OF THE HUB STRUCTURE ON THE VIRTUAL LISEC CAMPUS

From 15 to 17 June 2021, LiSEC will host a virtual trade fair for the second time. Automation solutions of the future, industry news from the LiSEC machinery and software sector and three exciting theme days: All this and more can be experienced on the virtual LiSEC Campus in the anniversary edition for the company's 60th year. On the second day of the fair, visitors can expect, among other things, the expert talk 'Strong partnership: Hubs', which will exhibit the new, worldwide branch structure at LiSEC, provide insights into the processes and explain the advantages for our customers.

LiSEC Group

LiSEC

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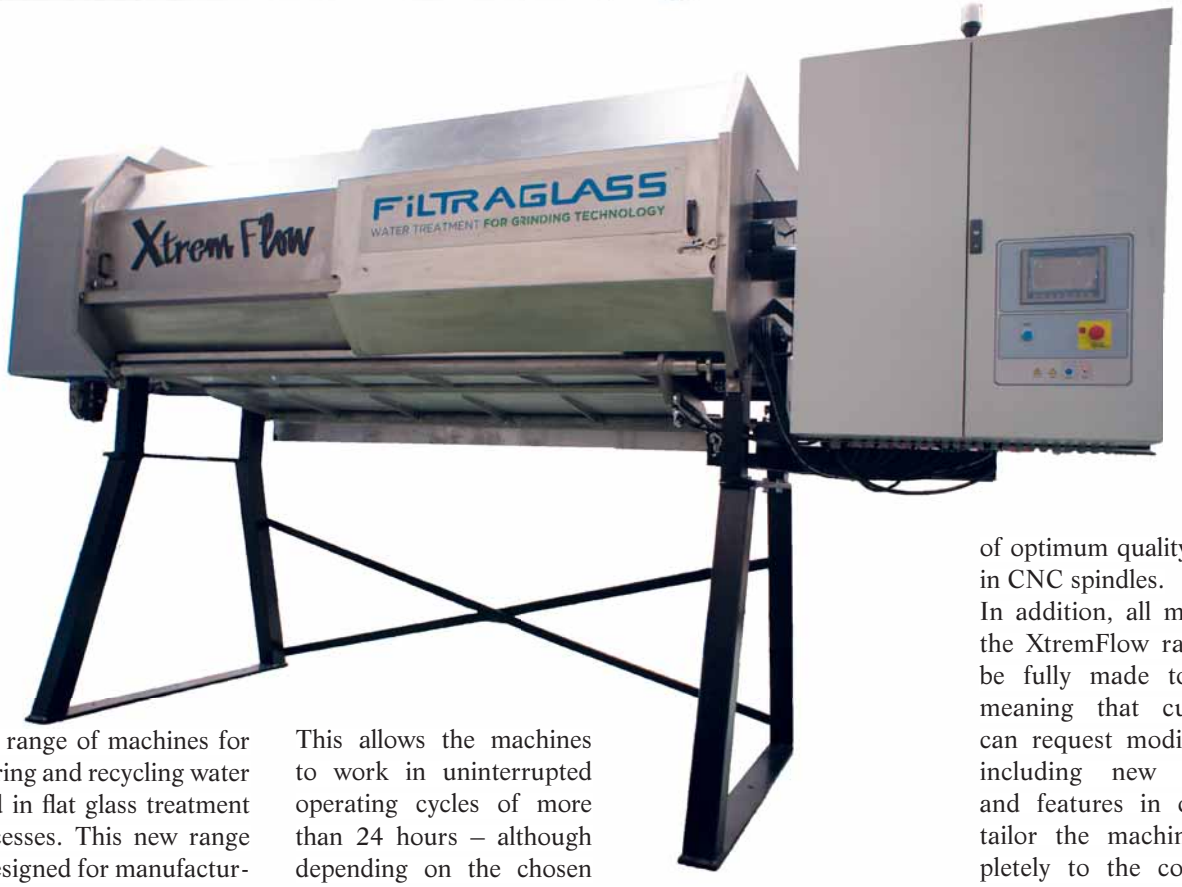
The art of recycling water at FILTRAGLASS

Filtraglass manufactures water filtration systems for all types of glass sectors, thus covering a wide industrial range, including the optical and automotive industries, as well as the transformation of flat glass in general.

Filtraglass is a dynamic company with more than 15 years' experience in the research and manufacturing of water filtration systems. The company has, during these years, become a reference in the sector, with regards to its planned and structured work, and innovative, dynamic and sustainable strategy.
Filtraglass machines filter and extract the particles of glass that are found in the water used in glass treatment processes, thus obtaining clean, reusable water on one hand and dry, recyclable solid waste on the other.

FILTRAGLASS LAUNCHES XTREMFLOW FOR HIGH WATER USAGE

In accordance with its strategy of continuous research, development and innovation, Filtraglass has launched XtremFlow, a



new range of machines for filtering and recycling water used in flat glass treatment processes. This new range is designed for manufacturers who need large quantities of water to be filtered in line with their production rate requirements.

Unlike the other Filtraglass ranges, these machines feature a new filtration system: filter presses, which make it possible to recycle large volumes of water ranging from 200 l/min to more than 2,000 l/min.

One of the most important new features offered by XtremFlow is that the machines in the range have one of the highest-quality filter surfaces on the market. This allows the machines to work in uninterrupted operating cycles of more than 24 hours – although depending on the chosen model and the amount of glass particles in the water, this figure may vary – which means a reduction of up to 40 times the number of daily cycles. Such long operating cycles have a clear benefit: compressed air consumption is reduced by more than 90 per cent. Moreover, the amount of dry waste that is extracted is increased, ranging from 40 kg per discharge to over 800 kg, depending on the model.

The new XtremFlow range includes seven different models, each designed for a specific volume of water, so customers can choose the model that best suits their needs.

All models in the XtremFlow range include a touch screen on the control panel that allows users to programme the machine and choose automatic or manual operation, among other things, as well as several new features such as a pH meter, a turbidity gauge and a complementary filter for producing filtered water of optimum quality for use in CNC spindles.

In addition, all models in the XtremFlow range can be fully made to order, meaning that customers can request modifications including new add-ons and features in order to tailor the machine completely to the company's specific needs.

If your company is looking to invest in a large water recycling machine, XtremFlow is without a doubt your best option.

Filtraglass SL

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Lamination, tempering and chemical tempering furnaces from TK

With over 20 years of experience in the glass industry, TK specializes in the design and construction of furnaces for lamination, tempering and chemical tempering, all with the possibility of customization and, therefore adapting to all customer needs.

Intrinsically Italian, TK designs and manufactures high-quality and innovative Made in Italy glass machinery, appreciated worldwide. Thanks to the company's values, technology, customization and high-quality standards are at the base of the construction of TK machinery: the furnaces are able to adjust to any small-, medium- or large companies' needs, whether wanting to start a new production line, expand the existing one or improve the qualitative performances of finished products.
Reliable, with refined details and technologically advanced: this is how a client would describe a TK furnace, supporting glass fabricators on a daily basis

TK Chemical Temper

TK Lamijet Convection

and, therefore, guaranteeing extremely satisfactory performance: an output of products that are qualitatively competitive with a significant reduction in production costs.
Technological innovation and peace of mind are fundamental elements for TK, that's why the company has developed two methods for the remote control of production: thanks to a PLC or Thermo Computer, customers can constantly monitor production processes, in compliance with Industry 4.0 standards.

CUSTOMIZATION

Thanks to the possibility of customization, the customer can find the right furnace, choosing among TK's four product lines: laminating furnaces – the company's core business, chemical tempering furnaces, Heat Soak Test furnaces and thermal tempering furnaces.
TK has developed three laminating technologies, Lamijet, Convection and Breva, three products designed for different types of production: according to the type of interlayer, to the necessary heating and cooling systems, and to the need to add an HST cycle.
TK has also taken into account the needs of the market in the development of thermal tempering furnaces with three product lines, Easy Temper, Star Temper and Master Temper, starting from small production lines up to production plants covering each and every production need.

CHEMICAL TEMPERING

TK chemical tempering furnaces are complex machines with exceptional details, that allow glass to obtain higher mechanical properties than the ones obtained through a thermal tempering process.
The mechanical resistance of chemically tempered glass is 5 to 8 times greater than thermally tempered glass and the resistance of the glass to impact is higher.
Despite decades of experience in the construction of chemical tempered furnaces, TK has never stopped improving the performance of its machines: To date, TK furnaces allow to process glass maximum size of 2500mm h. x 4000mm w. x 1500 mm l., which takes place in a tank containing 42 tons of Potassium Nitrate (KN03).
Thanks to technical know-how, the reliability of a Made in Italy production process, European raw materials of proven quality and the ability to focus on the real needs of consumers, not only in terms of production but also from a professional point of view, TK works side-by-side with customers along their growth path necessary to compete in an increasingly demanding market.

TK Lamijet 04-2C

LASERMEK laser machines designed specifically for the glass sector from GLASS COMPANY

LASER TECHNOLOGY AS A SPECIALIZATION

Being specialized in laser technology allows Glass Company to provide machines with specific characteristics that include:

- The removal of paint – also from mirrors – leaving the surface completely transparent. This system is widely used by mirror manufacturers for bathrooms, as well as for painted/enamelled glass used in the furniture industry.
- The removal of vitrified paint from the surface of tempered glass, leaving the surface completely translucent, a system that is used by glass makers for the furniture and building sectors, to create logos and symbols on tempered glass.
- The removal of the coating from reflective glass, including dielectric coat-

Glass Company is specialized in the supply of high-tech machines, equipment, tools and products for the glass industry, used in the flat glass sector for building-, furniture-, home appliance-, refrigeration-, marine- and railway sectors, just to name a few.

ed glass (spy mirrors), leaving the glass completely transparent. This system is used in the furniture industry to make doors for furniture, partition walls, interior doors, etc., when transparent parts or decorations are required.

- Micro ablation of the metal coating of most low-E glass types (hard and soft coating), used by manufacturers of refrigerator doors to make anti-fogging and heating glass (thermal).
- Ablation of low-E coating from glass for railway carriages, motorhomes or the facades of airports and similar places, to increase permeability to radio waves, such as those of portable phones.
- Engraving the glass internally both in two-dimensional flat or extruded layers, as well as complex figures generated by three-dimensional files.
- Micro engraving the surface of the transparent glass, used by manufacturers of tempered glass, or special glass that needs differentiated marking, or complex logos.

HEATING GLASS

For sectors where heating glass is required, Glass Company offers a laser machine for straight and shaped cutting, along with the removal of electroconductive coating.

This last-generation laser does not affect the surface of the glass but only removes the coating with speed and precision.

LASERMEK BEAM carries out micro ablation of the metal coating of most low-E glass types with hard and soft coating, used by manufacturers of refrigerator doors to make heating glass (thermal), for the manufacture of anti-

Laser cutting features

fogging and for micro-etching on metallic coating, generating shaped and/or straight lines at high speed.

LOW-E REMOVAL

LASERMEK SCANNER can, by means of ablation, remove parts of low-E coating ranging from 0.05mm up to 10s of millimetres, in a single passage. This laser is used to remove the perimeter coating of insulating glass, the creation of textures for glass for the railway-, marine, refrigeration industries, etc.
thanks to cutting-edge technology, this high-speed machine is ideal for companies looking for the highest quality.
Both models of this range remove electrically conductive coating in a way not visible to the human eye, interrupting its electrical conductivity.

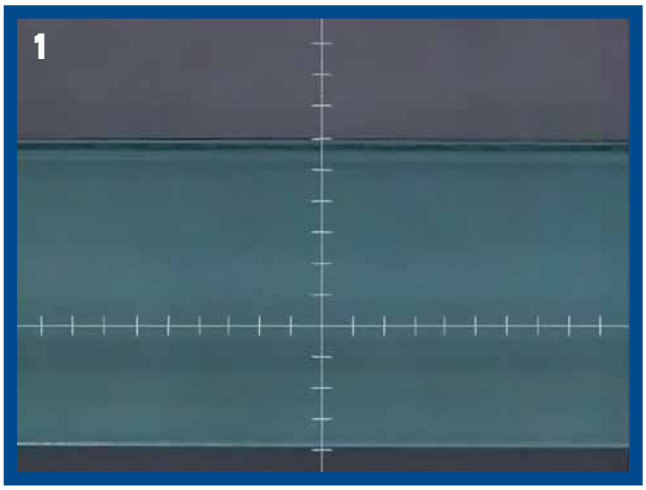
MIRROR GLASS

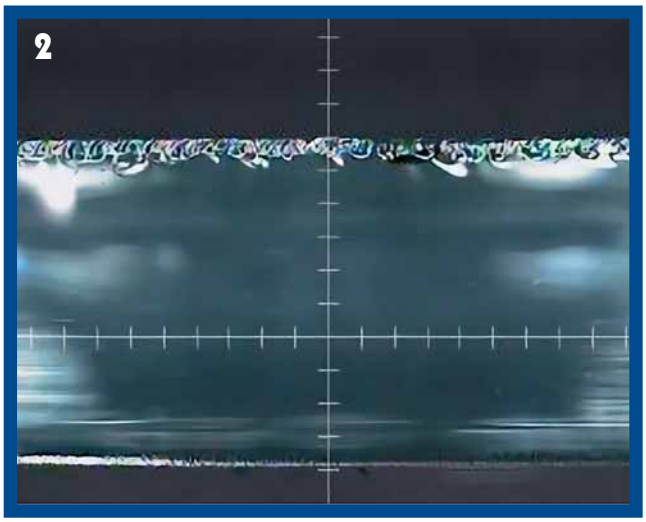
with regards to the bathroom furniture sector, and where the mirror glass is required, the laser is able to remove the paint from the mirror leaving the glass completely transparent, thus enhancing decorations, and the insertion of TVs or magnifying glasses.
LASERMEK BEAM and SCANNER ranges adapt to all types of production requirements with medium/low production machines up to highly productive machines.

FLOAT GLASS CUTTING

LASERMEK glass surface processing lines also include the new technology regarding the cutting of float glass up to thicknesses of 8/10mm.
Thanks to the use of latest generation laser sources, Glass Company offers a laser system suitable for straight and shaped cutting of the glass with an optimal area of 200x200mm, which can be expanded in accordance with customer needs.
The glass cutting laser is useful for the cutting of all types of shapes for hinges, square holes and similar processes.
Thanks to high-tech laser source technology and software dedicated to glass cutting, different solutions have been developed that ensure perfect cutting results, without chipping, which are also suitable for glass tempering, as can be seen from the picture below.

1 - Cross section of laser cutting
2 - Cross section of mechanical cutting





The very low consumption laser source is suitable for multiple processing to be carried out on the edges of large glass sheets or small-sized cut glass of 200x200mm in each type of geometric shape with extreme precision, speed and reliability.

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Long-lasting and reliable machines since 1950 from SCHIATTI

In this article, Cinzia Schiatti – International Sales Manager at her family's company Schiatti Angelo – speaks about the company, its products, and how it is dealing with the adverse global situation and the ongoing developments regarding Industry 4.0.

Schiatti is a historic company that has its roots in the 1950s, which has always stood out for the value of its reliable and long-lasting machines. Over the decades, experience, knowledge of the market, and innovation has brought the company to the present, in the era of the fourth industrial revolution, with smart factories and online production management.

INDUSTRY 4.0

It is funny to say this but while we are trying to understand its implications and what it will become, we are already experiencing the consequences of this new era; just think of the advances in artificial intelligence (AI), robotics, Internet of Things (IoT), 3D printing, genetic engineering, quantum computers and other technologies, that we experience in everyday life such as voice-activated virtual assistants, personalized pay-TV suggestions, and social media's ability to recognize your face and tag you in

a friend's photo. All this is radically changing almost all business sectors – at a frenetic pace.
On the one hand, Schiatti has tried to use new technologies to offer customers a better experience and, on the other hand, has tried to ensure the right mix of skills in its workforce, to keep pace with technological change.
That technology now allows to offer higher levels of personalization and more valuable and connected experiences directly and by means of online channels, Schiatti, which has always paid close attention to the interests of its customers, is focusing more than ever on offering an experience that distinguishes the company from its competitors because customers today expect ad hoc solutions.

DIVERSIFICATION BY TYPE AND PRODUCTION CAPACITY

The diversification by type and production capacity of machines allows Schiatti to satisfy both large industries and small- and medium-sized workshops.
For large standardized productions, the main request is that of reducing labour costs by means of smart machines able to connect to a network to process data, exchange information with other production plants and manage their life cycle.

CURRENT PRODUCT RANGE

Schiatti's offer in this respect involves both the new BFP35 bilateral machine for flat edges, created thanks to the combination of Schiatti double edger lines with the modern technology of fully automatic spindles for the horizontal processing of glass sheets, as well as with vertical 'turnover' units designed to connect two or more vertical edgers/bevellers and units that rotate glass sheets by 90°. The complete four-sided processing line is generally made up of four edging/bevelling machines and three turnover units.
For small and medium-sized workshop businesses, Schiatti offers a wide range of straight-line edging machines such as the SME10 straight line edger with variable angle from 0° to 45° capable of processing small, 50x100mm pieces of glass, up to large dimensions on thicknesses from 3 to 30mm.
All Schiatti products are Made in Italy and feature flexibility as their main features, ensuring the ability to adapt products to the specific needs of each and every customer.

Schiatti Angelo Srl

SCHIATTI ANGELO
TRADITION, EXPERIENCE, INNOVATION

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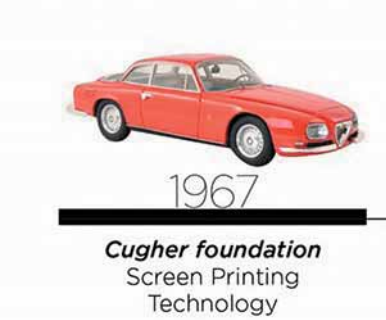
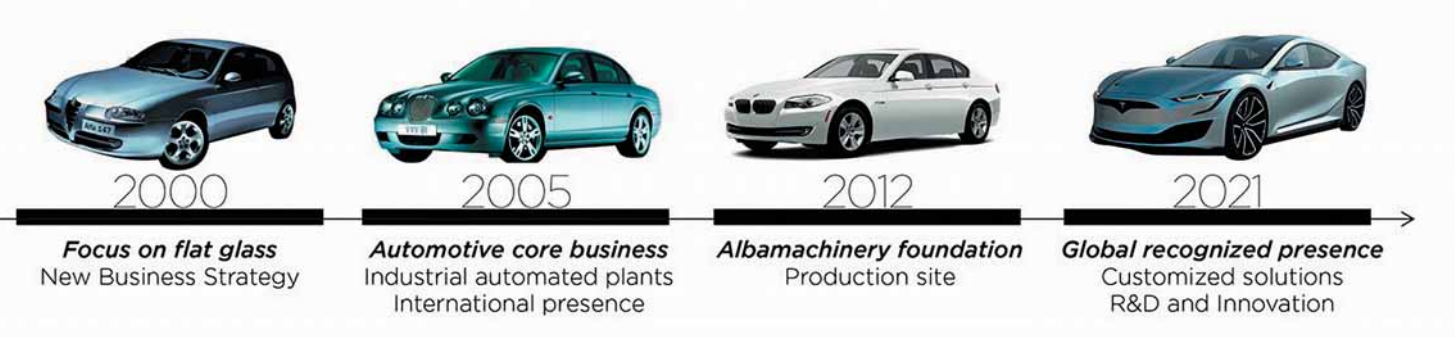
CUGHER GLASS: Change and flexibility as a driving force for growth and innovation



Founded more than 50 years ago, Cugher Glass has continued to grow, developing ever more performing and technologically advanced solutions, and is recognized at global level as one of the most innovative manufacturing companies in its reference market.



Cugher Glass was founded in 1967, focusing its business on the design and production of machines for screen printing on glass, textiles, electronics and household items. Over the years, the constant development of new, increasingly performing and technologically advanced solutions, have led the company to focus its business on the flat glass sector.

From that moment on, Cugher started to have an international role, becoming a par-excellence partner for the supply of fully automated machinery and lines for screen printing.

CORE VALUES

At present, Cugher is recognized globally as one of the most innovative manufacturing companies in its reference market and it stands out thanks to its core values:

- reliability of its solutions as well as the ethos of its organization;
- shared know how and focus on client driven projects; Cugher's clients are partners;
- performance and quality inherent not only to products but also to service;
- cutting-edge engineering and customization of products and processes that comes from listening carefully to customers' needs.

CUSTOMER ORIENTED BUSINESS

The Automotive sector is, and has always been, the core business of the company, which supplies highly automated and customized plants to multinational corporations producing automotive glass, such as AGP group, Vitro, AGP E-Glass, Saint Gobain, etc.

Considering that projects regarding screen-printing lines are complex, and the engineering details are very specific, Cugher's Team encourages an open dialogue with its customers, effectively cooperating during the most delicate parts of the project, from the definition of specifications to the design, and up to installation. This partnership has allowed the realization of challenging projects to handle, print and control all glasses, from the biggest (windshields) to the smallest (vents), ensuring high productivity.

The experience gained from the automotive sector has led the company to work with other flat glass sectors too. Machines have been specifically created for the home appliance industry, where fast cycle time and quick production changeover are basic characteristics. Careful and concrete listening to the needs coming from the sector has allowed Cugher to collaborate with prestigious customers, guaranteeing high quality and productivity.

Cugher's flexibility in engineering has also allowed it to satisfy the requirements of clients operating in the

Smart Glass used by technician

Building & Interior Design sectors, often characterized by the need to manage small lots, squared shapes and variable dimensions. Moreover, the machines developed by Cugher for this type of sector offer the possibility of being used as stand alone-, or in-line machines, according to the different production needs of each customer – large or small.

The experience in handling glass sheets, also those with large dimensions, and the cooperation with other partner companies producing plants, has allowed Cugher to specialize even further. Today the company is capable of offering different types of handling systems, as well as robotized systems for the loading and unloading of processing lines.

CHALLENGES FOR GROWTH

Cugher has been able to capture the opportunity of growth and development to sustain its business. Over the past year, just like many other companies, Cugher faced the challenges imposed by the restrictions of the Covid 19 global pandemic, innovating its working mode.

The impossibility to travel and to work 'on-site' encouraged the renewal of connection and communication methods with customers and suppliers. For instance, thanks to the innovative use of sophisticated smart glass (augmented reality) during conferences, customers can attend screen printing lines tests and verify the print quality on glass and the performances of the plant remotely.

Moreover, Cugher is increasing its presence at digital events, from conferences to exhibitions, exploiting communication through web services, so as to be always close to its customers, also from a distance.

The company sustains and plans to strengthen this digital transformation, searching the right connection between people and technology.

PROGRESS IN COMMUNICATION

The changes that the company is making, both in-house and towards customers, and the expansion of the business in recent years, have raised the consequent and natural need to develop a new marketing plan. Cugher intends to share the core values that distinguish it as a global leader, such the reliability of solutions and the ethics of the organization.

Cugher produces customized and cutting-edge products, and the new graphic design, that supports a set of communication projects, consists of an elegant and prestigious multimedia, designed to effectively convey the excellence of the Cugher brand.

Company performance is – as always – future-oriented and this involves all functions, including marketing.

New communication projects

Cugher Glass Srl

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Supporting organisations:

Glasstech Asia Online Conference 2021 - participation from over 10 countries

For its 2021 edition, Glasstech Asia introduced a new online platform – Glasstech Asia Virtual, facilitating virtual booths, conferences, and business matching. The online conference was successfully hosted on the platform, providing attendees a heightened experience and seamless user interface.

Glasstech Asia Online Conference, powered by BAU and BAU China, took place on 27 April 2021. Leading the glass and facades community ahead, the online conference brought together a network of glass and facades professionals around the world, to learn, discuss and to explore new networking opportunities through technology.

Following the success of the first online conference, Glasstech Asia Online Conference 2021 brought together over 150 registered attendees. Key trending topics of the industry such as Manufacturing & Processing Innovations; Digitalisation: The Evolution Towards A Smart Factory; Architectural Designs: Design Trends of Post Pandemic Buildings; Architectural Designs: Advanced Building Skins/ Advanced Facade Technology; Built Environment: The

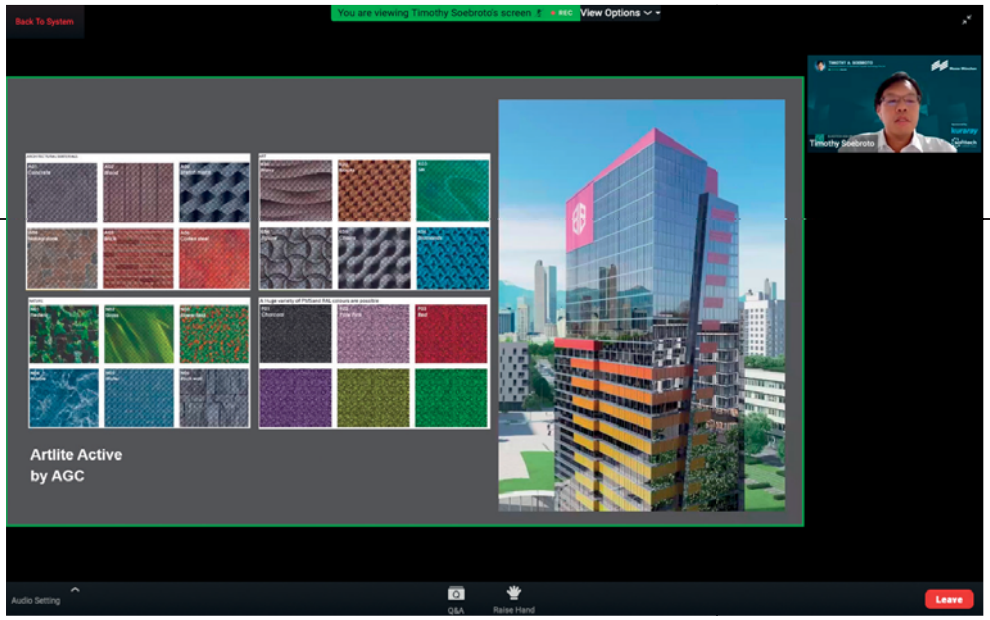
New Singapore Standards SS653 and SS654, was covered in the conference and spurred active interactions between the attendees and speakers during the final discussion round.

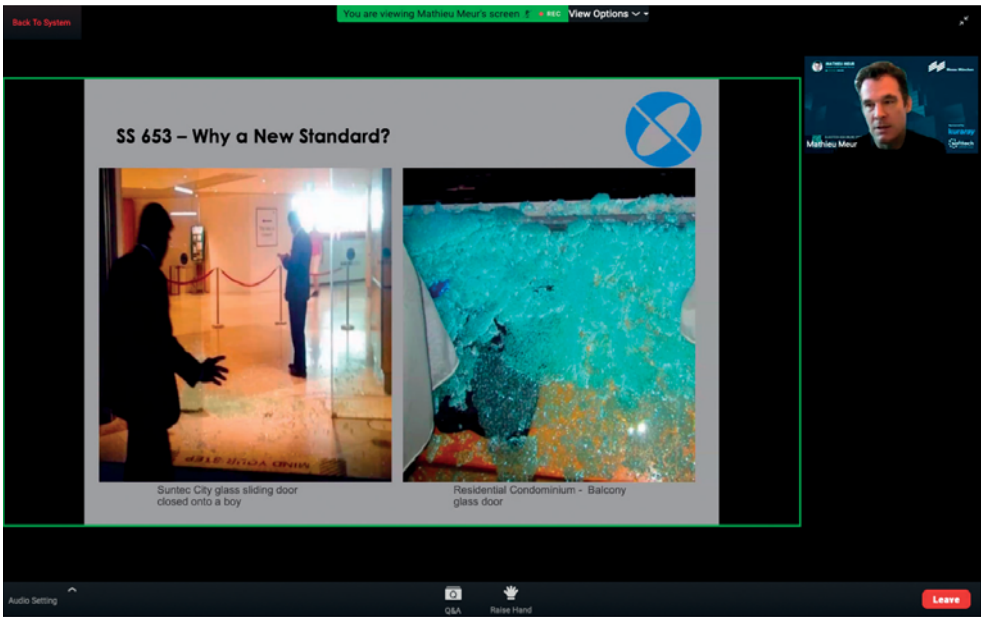
KEY HIGHLIGHTS

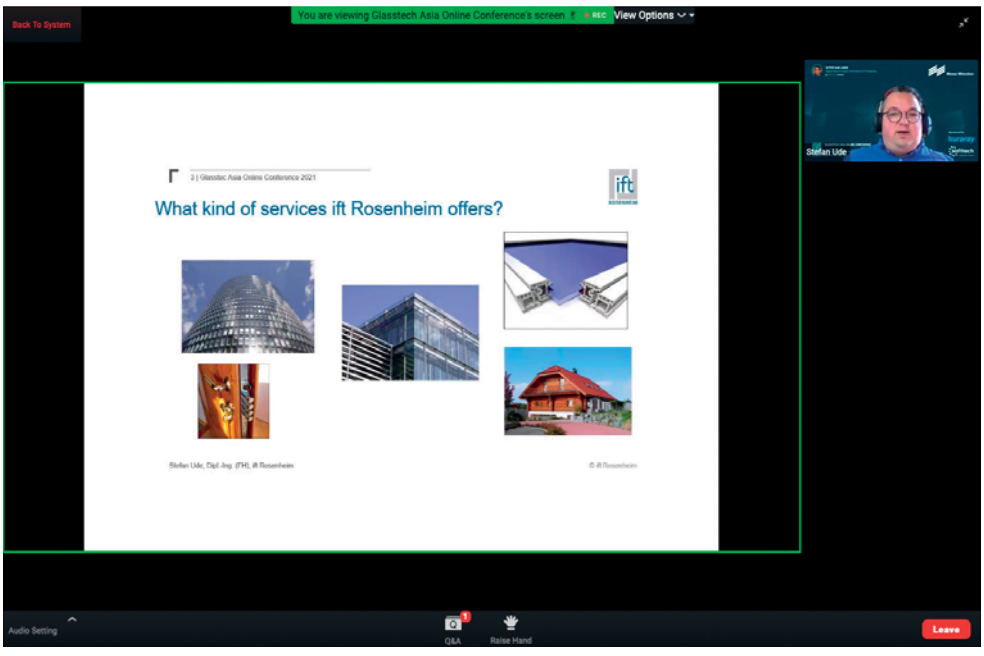
Speaking on Manufacturing & Processing Innovations, Christoph Troska, Head of Marketing & Business Development at Kuraray Europe GmbH, shared interesting insights on structural glazing and the increasing need for security globally. This is critically important due to the changes in the current global climate, affecting the specifications and requirements for glass and facades in buildings.

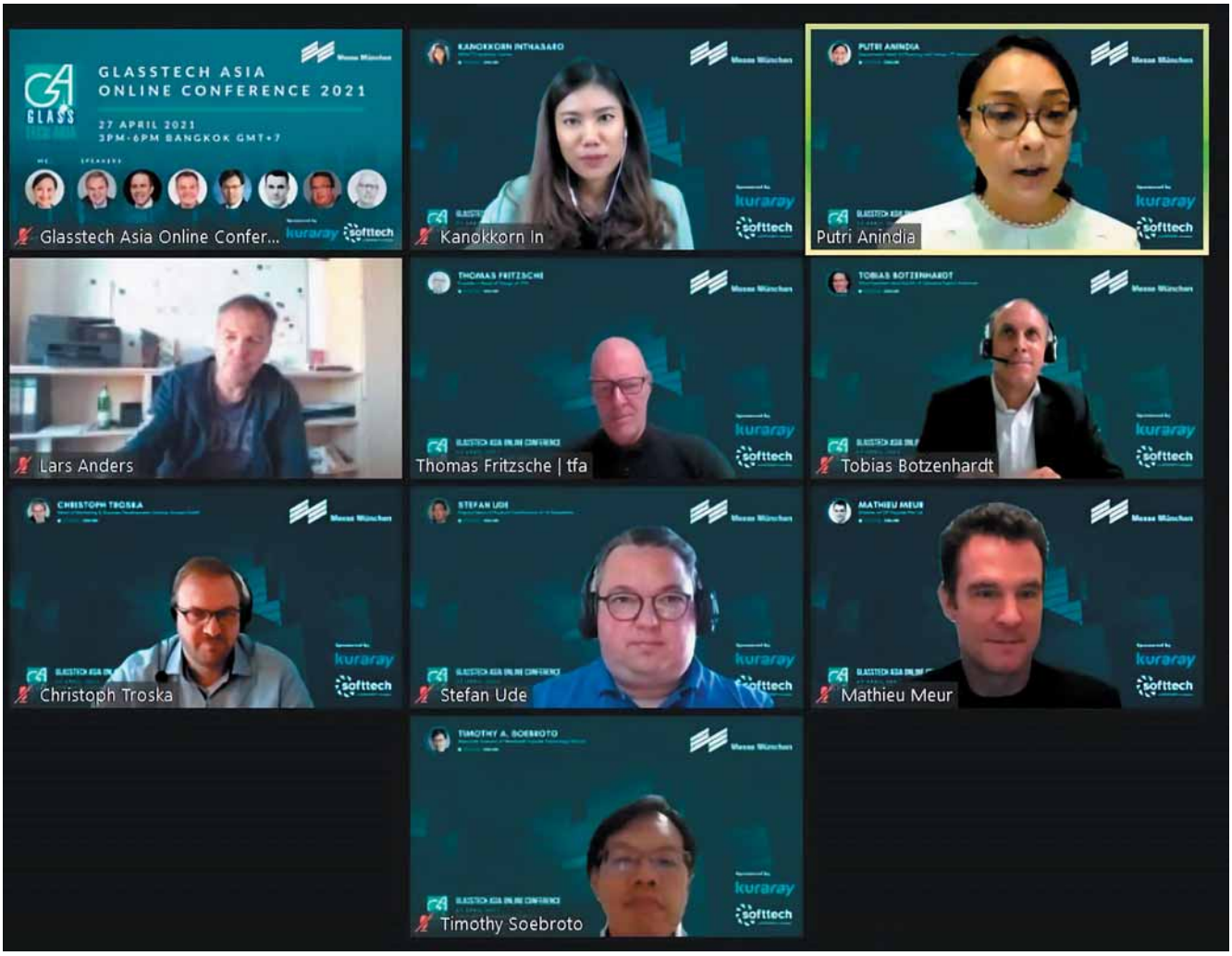
Next up, Tobias Botzenhardt, Vice President Asia Pacific of Siemens Digital Industries, shared on Digitalisation: The Evolution Towards A Smart Factory. During his informative session, key business issues faced amongst customers and partners during the COVID-19 pandemic was shared and later addressed with digital solutions to overcome these challenges.

This was then complimented by Lars Anders, CEO of Priedemann Holding GmbH, who talked about Facade Engineering in the Post Covid Era: "When it comes to digital knowledge, we have seen in Covid times, where anything that was digitalized already had seen a massive growth on deliverables and profits. We need to rethink our view on









MESSE MÜNCHEN

Messe München is one of the leading exhibition organizers worldwide with more than 50 of its own trade shows for capital goods, consumer goods and new technologies. Every year, a total of over 50,000 exhibitors and around three million visitors take part in more than 200 events at the exhibition centre in Munich, at the ICM – Internationales Congress Center München and the MOC Veranstaltungscenter München as well as abroad. Together with its subsidiary companies, Messe München organizes trade shows in China, India, Brazil, Russia, Turkey, South Africa, Nigeria, Vietnam, and Iran.
With a network of associated companies in Europe, Asia, Africa and South America as well as around 70 representations abroad for over 100 countries, Messe München has a global presence.

this problem by building a digital bridge."
Timothy Soebroto, Associate Director of Meinhardt Façade Technology Pte Ltd: "The evolution of architectural style has an implication to the evolution of glass facade industry." During his session, he covered the evolution of glass facades, its' impact, strategy to keep up with the evolution, and the future of glass facades.
Taking on a different approach, Mathieu Meur, Director of DP Façade Pte Ltd, touched on the technical aspects of glass where he introduced the New Singapore Standards SS653 and SS654. The session highlighted standards for adoption suitable for the regional climates and temperatures, multiple risks and issues that could result in glass breakage in past products. All of which is highly pertinent for glass manufacturers to take note of.
Furthermore, the online conference called attention to Architectural Designs: Design Trends of Post Pandemic Buildings,

GLASSTECH ASIA 2021/FENESTRATION ASIA 2021

Coined 'The Glass Hub of Southeast Asia', Glasstech Asia is an annual rotating exhibition that focuses on all things glass. The upcoming 18th edition of Glasstech Asia, along with the concurrent event – Fenestration Asia, will be held on the 16-18 November 2021.
Returning to Bangkok, Thailand for the fourth time, the three-day event brings together the best of the Southeast Asian glass and glazing sector, from glass manufacturing, processing, and machinery to accessories, raw materials, and finished glass products. Coupled with high-powered symposiums, forums, workshops, and an exciting Glass Installation Competition, it is an event not to be missed.
Additionally, Glasstech Asia and Fenestration Asia aim to meet and satisfy the increasing global demands for eco-friendly windows, doors, and facades by focusing on new industry standards in sustainability, automation, and energy-efficiency topics. With a focus on green and smart fenestration technologies to bring about a more sustainable, energy-efficient, and liveable future, the exposition is strategically geared towards helping the architecture, building, and construction sectors in countries meet their energy targets.

a highly discussed topic in the industry. It was an interesting segment well presented by two reputable speakers: Stefan Ude, Deputy Head of Product Certification of ift Rosenheim; Thomas Fritzsche, Founder and Head of Design of TFA Architects.
Besides these live sessions, Glasstech Asia Online Conference also featured on-demand components that are only accessible to delegates that have an account on the Glasstech Asia Virtual platform.

VIRTUAL EVENTS IN 2021

Glasstech Asia Online Conference 2021 is the first of many upcoming virtual events in Glasstech Asia series taking place this year, leading up to its physical show in November.
With the successful end of Glasstech Asia's Online Conference 2021, and the introduction of a new partnership with PERAFI, Indonesian Façade Association, Glasstech Asia will be releasing a sequence of bi-monthly webinars that touches on different aspects of Facades.
Additionally, Glasstech Asia Virtual will begin to initiate and facilitate business matching activities amongst delegates via the platform, with the aim to spur and encourage business opportunities and discussions between glass and facades professionals.
Lastly, the annual Glasstech Asia 2021 trade show will continue to take place in Bangkok, Thailand on the 16th to 18th of November this year. As compared to the previous edition, the trade show will incorporate virtual digital components, offering virtual booths, extensive business matching features and enhanced networking functions.
Glasstech Asia Online Conference 2021 (April edition) was sponsored by:

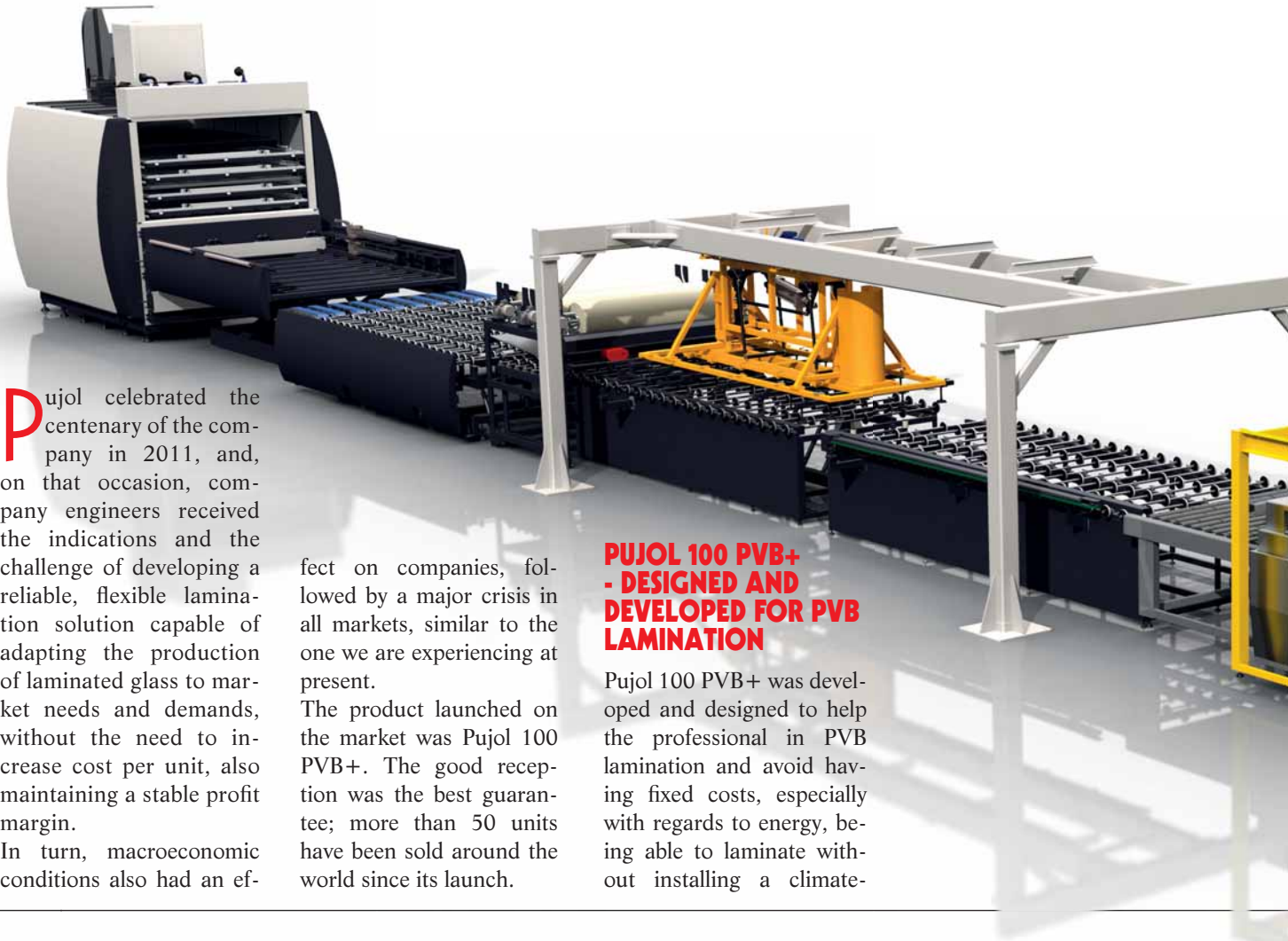
and was supported by the following associations:

All conference sessions are recorded and will be uploaded on Glasstech Asia Virtual. Follow us on our social media channels to stay up to date.

BAU NETWORK

BAU is the World's Leading Trade Fair for Architecture, Materials and Systems. Everyone involved in the international community for planning, building and designing buildings comes together here—i.e. architects, planners, investors, representatives of the industrial and commercial sectors, the building trades, etc.
It is where future-oriented manufacturers come together with an audience of interested professionals. Their primary interests include the latest techniques, materials and applications that can be used in actual practice. This is where visitors experience the future of building in person.

PUJOL 100 PVB +, ten years of a landmark that transformed the laminated glass industry



Pujol celebrated the centenary of the company in 2011, and, on that occasion, company engineers received the indications and the challenge of developing a reliable, flexible lamination solution capable of adapting the production of laminated glass to market needs and demands, without the need to increase cost per unit, also maintaining a stable profit margin.

In turn, macroeconomic conditions also had an effect on companies, followed by a major crisis in all markets, similar to the one we are experiencing at present.

The product launched on the market was Pujol 100 PVB+. The good reception was the best guarantee; more than 50 units have been sold around the world since its launch.

PUJOL 100 PVB+ - DESIGNED AND DEVELOPED FOR PVB LAMINATION

Pujol 100 PVB+ was developed and designed to help the professional in PVB lamination and avoid having fixed costs, especially with regards to energy, being able to laminate without installing a climate-

Hornos Industriales Pujol celebrates the 10th anniversary of the development of the Pujol 100 PVB + lamination furnace, which represented a turning point in the way of understanding the laminated glass industry.

Pujol 100 PVB + extra bending chamber

controlled room, without calendering and reducing total machine investment.
Moreover, in addition to complying with an ecological standard that makes the deduction such as R + D/IT viable, the system also avoids unnecessary risks, such as explosion, something that can take place with autoclave systems.
When glass processor use EVA films, the furnace works with a high-speed Fast Curing system that allows to carry out productive cycles every 40 minutes at full load, achieving production levels of more than 1,000 square metres per day, depending on the model.

Pujol e-Connect as standard

Pujol 100 PVB+ incorporates Pujol e-Connect, an advanced system that has allowed to adapt Pujol furnaces to Industry 4.0, as standard. It also offers interesting functions, such as real-time connection to the furnace, the possibility of receiving remote technical assistance, and secure connection from any external device with internet access (mobile, tablet or computer), along with traceability of production processes. These characteristics provide glass processors with greater control of what is being carried out by the furnace at all times, achieving greater comfort and peace of mind.

Higher levels of production

Pujol 100 PVB+ provides even higher levels of production, incorporating an assembly line that has been developed to automatize the manufacture of EVA/PVB laminated glass. Thanks to it, the costs are reduced and the quality of the laminated product is increased by squaring them automatically without the operator making a great effort. The line can also be fully adapted to the characteristics or

Installation of two Pujol 100 furnaces mounted in parallel

the layout of the workshop through three possible configurations. This versatility makes it easy for any glass processor to install a line of unmatched features.

Hornos Industriales Pujol knows very well that each client has unique needs. Company engineers have worked on interesting projects over the last ten years, with a series of different unique cases that deserve to be highlighted. An example is one of the most recent installations carried out in Val y Val, a glass processor with great traditions and experience, located in Mexico. For this customer, Pujol opted for a Pujol 100 PVB+ furnace equipped with an extra bending chamber, thanks to which, together with the great benefits of the furnace, Val y Val have been able to carry out important projects.

To date, three of their clients have expanded their facilities by repeating the purchase of a Pujol 100, one of them even has six Pujol 100 PVB + furnaces in their facilities. These are clear examples of the reliability of Pujol 100 PVB + and the current growth it is achieving.

Pujol 100 PVB+ & full automatic lines

Total precision, maximum reliability and greater savings

- It allows the lamination of PVB / EVA / ionoplastics (SGP).
- Humidity and temperature control are not required for either storage or treatment.
- Fixed energy costs independent of production volume.
- Cost reduction owing to greater energy efficiency, up to 70% when compared to traditional autoclave systems.
- Maximum precision and reliability.
- Reduction of raw material costs, requires fewer layers of film than PVB tempered glasses.
- It does not require a pre-laminate line.
- Requires less plant space.
- Minimal operator effort.
- High production rates.
- Ready for industry 4.0.

www.hornospujol.com hipujol@hornospujol.com Tel.: (+34) 936 855 627 /HornosIndustrialesPujol

Focus on sales and after-sales at BAVELLONI

During a recent video interview with Bavelloni SpA, we had the chance to speak not only about the company and how it is continuing to grow and develop. Products and sales, but also after-sales services, are also a fundamental part of this company's activities.

COMPANY GROWTH, SALES AND AUTOMATION

In the first part of this article, made up of two separate video interviews, Glass-Technology International spoke to Federico Bassi, Sales Director & Partner of Bavelloni SpA.

Federico Bassi
Sales Director
& Partner.

Glass-Technology International (GTI): Mr. Bassi, how can you describe Bavelloni SpA nowadays?
Federico Bassi, Sales Director & Partner of Bavelloni SpA: Today Bavelloni SpA is a medium-sized and growing company with about 130 employees in Italy and more than 20 people working across our three sites abroad. We are undergoing continuous growth and generation turnover that gives our company a boost of fresh energy and dynamic perspectives for the future. We manufacture 100 per cent of our products in Italy and our offering includes numerically controlled machining centres, technologies for cutting, edging, drilling/milling, bevelling and washing equipment, available as stand-alone solutions as well as in integrated lines and robotic islands. We are also a manufacturer of a comprehensive range of grinding tools complementing our product range. Almost 90 per cent of our production is sold abroad.

GTI: Which recent developments and news can you tell us about your company?
Federico Bassi: In a nut-

Bavelloni America Inc.

shell, I would say: continuous growth. Bavelloni SpA's growth process initiated a few years ago with the opening of Bavelloni America Inc. in Greensboro (USA). Later Bavelloni acquired the tooling business and then became the main shareholder of Yalos Bavelloni Srl in the production of high-end washing solutions for flat glass. At present, the Bavelloni group also has another facility in Guadalajara, Z.Bavelloni México S.A. de C.V. (Mexico), and we are in the process of setting up a new branch in Brazil to further strengthen our presence and be closer to our customers in a strategic area such as the Americas.
Even and especially during the turmoil resulting from the pandemic, we were able to capitalize on the opportunity and continue on this development path. We are reinforcing our organization with the aim of consolidating our commercial and after-sales operations; new members have recently joined our sales and service teams. Customer service has always been Bavelloni's flagship and is recognized as one of the best and most appreciated among the glass processing machine manufacturers.

GTI: Which products have you recently launched on the market?
Federico Bassi: It's tough to think purely about new products in such a crowded and small market. For sure we are widening our offering as regards automation and integration to respond to the growing demand for productivity and efficiency, flexibility and process optimization. Robotic integration ensures safe, reliable and fast handling and streamlines manpower. In this field we can develop both simple or complex customizations to provide innovative and tailor-made systems in combination with Bavelloni machinery and other equipment. We can also design customized solutions to smoothly integrate existing stand-alone machines and turn them into automated plants. Our offering ranges from simple glass handling where the robot will just pick-up, rotate and transfer glass sheets from one vertical edging machine onto the second one to complex cells that operate fully automatically and feature, for example, two vertical edgers and two robots picking-up, loading, rotating and unloading the glass panes. Another fairly typical solution consists of two CNC machining centres and one robot for loading and unloading.

AFTER SALES

The second part of the article involves after sales, speaking to Luca Brambilla, Bavelloni After-Sales Manager.

Luca Brambilla
After Sales Manager

GTI: Mr. Brambilla, what does after-sales mean to Bavelloni?
Luca Brambilla, Bavelloni After-Sales Manager: Bavelloni after-sales includes service, spare parts and tools: a combination of products and support accompanying customers throughout the lifespan of their Bavelloni equipment.

GTI: Why are they all grouped together?
Luca Brambilla: After-Sales products and services are becoming key factors in building customers' loyalty and trust.
Bavelloni machines are either installed by Bavelloni field engineers or by our official distributors' technicians properly trained by us. They are the most skilled people who can support customers to maintain and repair their machines. Bavelloni is the original equipment manufacturer and this will ensure that customers have the correct part with the correct specification for any Bavelloni machine. Moreover, we have over 70 years of experience in producing tools specifically designed to optimize our machinery performance. We are skilled in the use of machinery and tools and, as a consequence, we can advise customers on the most suitable solution for every processing need. We believe that offering full support, including service, tools and original spare parts delivers a great value to customers thus helping to build trust and confidence over the time.

GTI: How is Bavelloni After-Sales organized?

Z. Bavelloni Mexico S.A.de C.V.

Luca Brambilla: Service, spare parts and tools require fast response times that can only be guaranteed by closeness to customers. In Italy, we have a staff of field engineers and a team of service experts providing remote support to customers and, when needed, to our service network worldwide. Since we sell most of our machines abroad, it is essential for us to have a global network of skilled service partners.
In addition to the service teams operating from our branches, we can also count on a widespread presence globally thanks both to long-term and more recent partnerships with official service providers around the world who can advise customers on the best solution for every production requirement and provide prompt on-site support in case of need.

GTI: What do customers expect from Bavelloni After-Sales?
Luca Brambilla: They expect competence above all. We have extensive knowledge of our machines and can ensure service on machinery running for over 20 years, also offering mechanical and software upgrades to extend their life cycle. Customers know that with us they can find everything they need to keep their machines in perfect working conditions, since we are both the machine and tool manufacturer.


Field service


Remote Support

GTI: So where will you be focusing on in the future?
Luca Brambilla: I have recently been entrusted with the responsibility of After-Sales Service after several years as Bavelloni Tools Plant Manager. The main goal in my new position is therefore moving towards a proactive approach, promoting preventive maintenance contracts and machinery upgrades to extend lifespan of our equipment, increasing at the same time their efficiency and productivity to create value for our customers.

Bavelloni Spa

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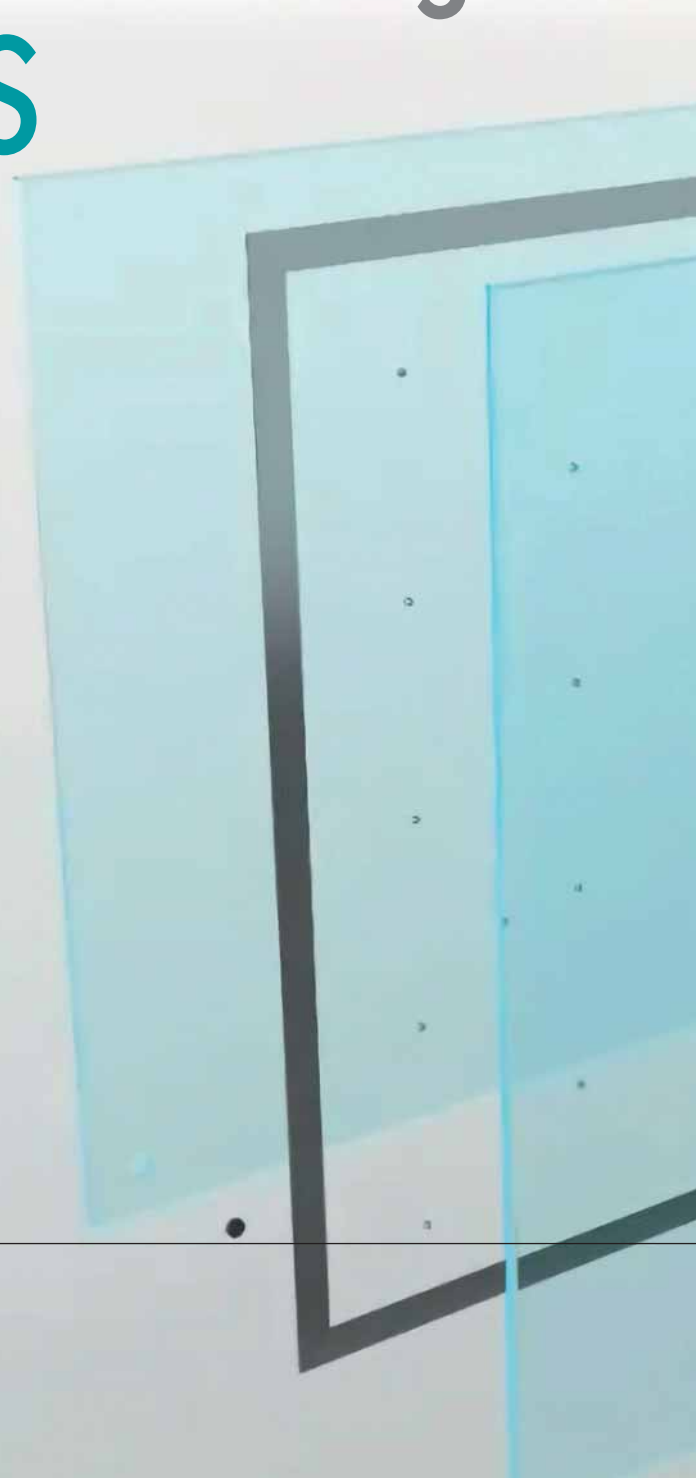
Six things to know when choosing the right vacuum insulated glass according to LANDGLASS

In this article, LandGlass provides a series of important aspects to bear in mind when choosing vacuum insulated glass, which provide a series of important features which will reduce the consumption of building materials and energy, reduce carbon emissions, and result in a healthy and sustainable quality of life.

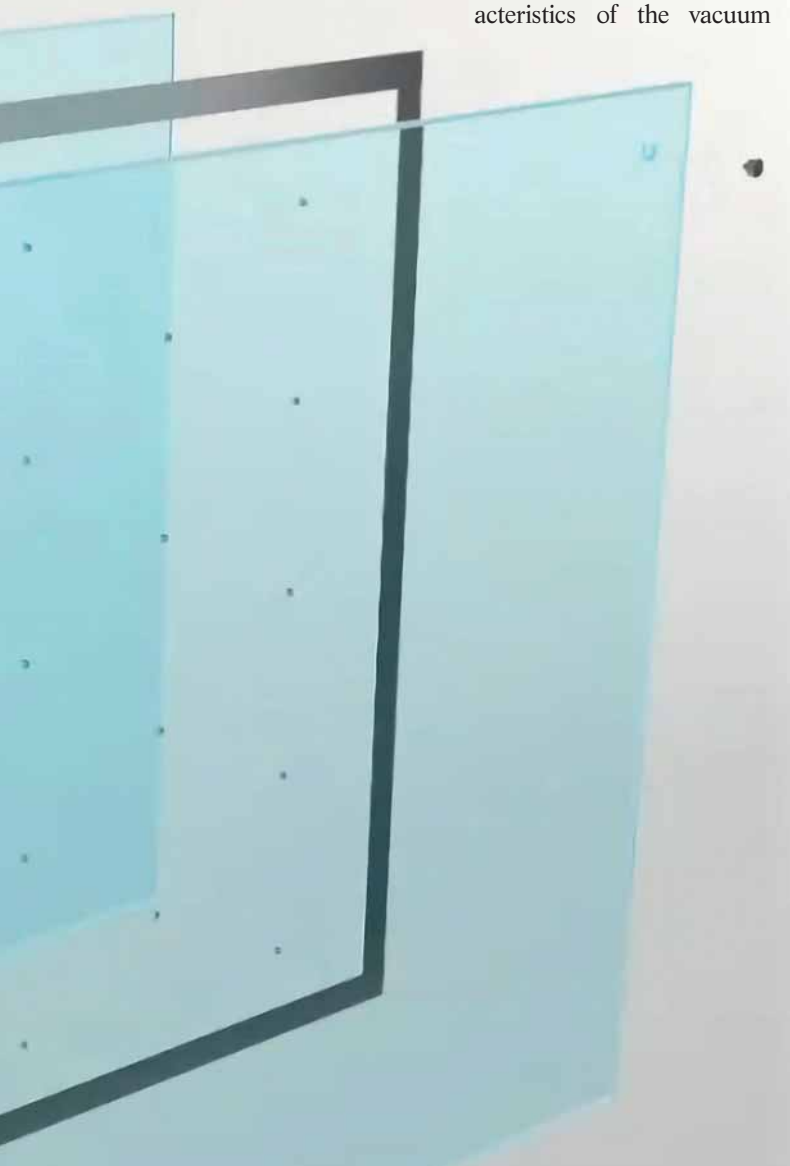


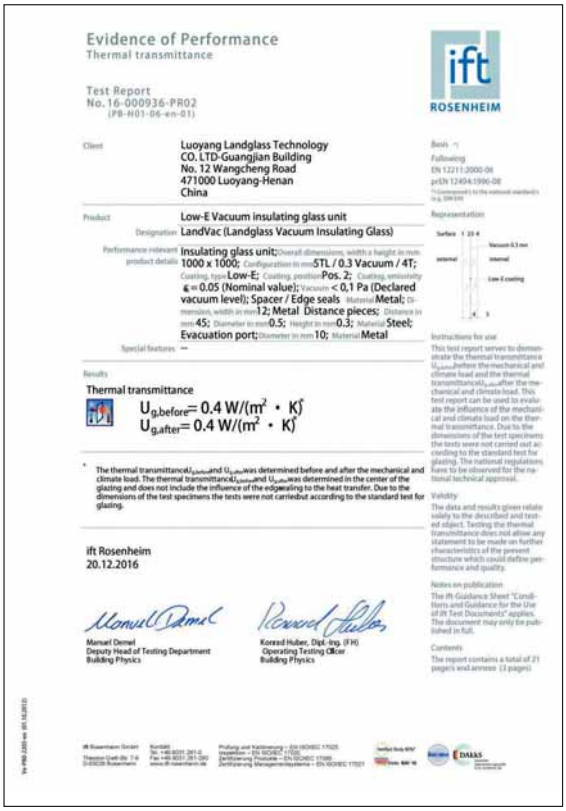
With the steady progress of the national energy conservation and emission reduction strategy of 'Carbon peak and carbon neutrality', and increasing pursuit of natural comfort, quiet and joyful quality of life by conscious people, vacuum insulated glass that offers ultra thermal insulation, noise reduction, and condensation-free features is gradually becoming known to the public and finds its applications in the fields of commercial and residential buildings as well as high-end refrigeration appliances. As

the market is now flooded with different types of vacuum insulated glass products and technologies, LandGlass provides the following key guidelines to help understand and choose the reliable vacuum insulated glass products.

1. THE PRINCIPLE AND STRUCTURE OF VACUUM INSULATED GLASS

Vacuum insulated glass consists of two or more glass panes separated with spacers. After the edges are sealed, the air inside is evacuated to create a vacuum space between the two panes. By using the near zero heat transfer and zero sound transmission characteristics of the vacuum





Evidence of Performance
Thermal transmittance

Test Report
No. 16-000936-PR02
(PB-H01-06-en-01)

ROSENHEIM

Client: Luoyang Landglass Technology CO. LTD-Guangjian Building, No. 12 Wangcheng Road, 471000 Luoyang-Henan, China

Product: Low-E Vacuum insulating glass unit
Designation: LandVac (Landglass Vacuum Insulating Glass)
Performance relevant product details: Insulating glass unit; 1000 x 1000; 5TL / 0.3 Vacuum / 4T; Low-E; Pos. 2; ε = 0.05 (Nominal value); < 0,1 Pa (Declared vacuum level); Spacer / Edge seals; Metal; 12; Metal Distance pieces; 45; 0.5; 0.3; Steel; Evacuation port; 10; Metal
Special features: --

Results
Thermal transmittance
$U_{g,before}$ = 0.4 W/(m² · K)
$U_{g,after}$ = 0.4 W/(m² · K)

The thermal transmittance $U_{g,before}$ and $U_{g,after}$ was determined before and after the mechanical and climate load. The thermal transmittance $U_{g,before}$ and $U_{g,after}$ was determined in the center of the glazing and does not include the influence of the edgesealing to the heat transfer. Due to the dimensions of the test specimens the tests were not carriedout according to the standard test for glazing.

ift Rosenheim
20.12.2016

Manuel Demel
Deputy Head of Testing Department
Building Physics

Konrad Huber, Dipl.-Ing. (FH)
Operating Testing Officer
Building Physics

Evidence of Performance
Airborne sound insulation of building components

Test Report
No. 16-000936-PR01
(PB 1-H01-04-en-01)

ROSENHEIM

Client: Luoyang Landglass Technology CO. LTD-Guangjian Building, No. 12 Wangcheng Road, 471000 Luoyang-Henan, China

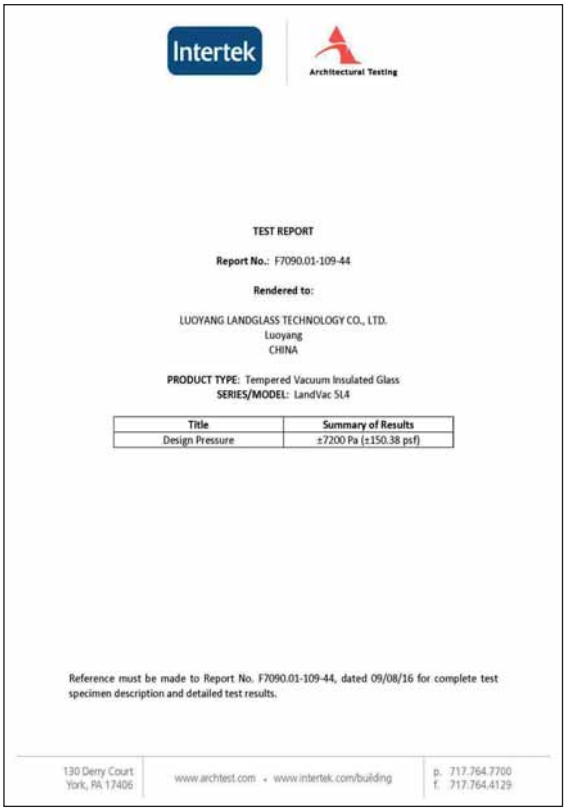
Product: Insulating glass unit
Designation: Tempered vacuum insulated glass
External Dimension (W x H): 1,000 mm × 1,000 mm
Construction: 5 Tempered Low-E Glass/0.3 Vacuum/4 Tempered Glass
Gas filling: Vacuum
Area related mass: 21.9 kg/m²
Special features: -/-

Weighted sound reduction index R_w
Spectrum adaptation terms C and C_{tr}
R_w (C; C_{tr}) = 36 (-2;-3) dB

ift Rosenheim
01.08.2016

Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department
Building Acoustics

Florian Brechleiter, MSc, Dipl.-Ing. (FH)
operating testing officer
Building Acoustics



Intertek

Architectural Testing

TEST REPORT

Report No.: F7090.01-109-44

Rendered to:

LUOYANG LANDGLASS TECHNOLOGY CO., LTD.
Luoyang
CHINA

PRODUCT TYPE: Tempered Vacuum Insulated Glass
SERIES/MODEL: LandVac SL4

Title	Summary of Results
Design Pressure	±7200 Pa (±150.38 psf)

Reference must be made to Report No. F7090.01-109-44, dated 09/08/16 for complete test specimen description and detailed test results.

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space, vacuum insulated glass is becoming the new generation of energy-saving glass products, providing outstanding performance in ultra thermal insulation and noise reduction.

2.WHAT ARE THE CHARACTERISTICS OF VACUUM INSULATED GLASS?

Vacuum insulated glass should offer reliable product performance, especially with regards to thermal insulation and noise reduction. Secondly, vacuum insulated glass should provide a certain degree of safety, retaining the characteristics of safety glass. Vacuum insulated glass should also be able to withstand certain external forces so that it can resist wind loads or temperature loads in applications. Last but not least, vacuum insulated glass must be able to sustain the stability of long-term performance.

3.WHAT TESTS DOES VACUUM INSULATED GLASS NEED TO UNDERGO?

Vacuum insulated glass undergoes three types of testing: safety testing, ageing testing, and on-line quality testing. Safety testing includes: fragmentation tests, impact tests, and wind resistance tests. Ageing testing includes: weathering resistance tests and sunlight

中国国家强制性产品认证证书

CERTIFICATE FOR CHINA COMPULSORY PRODUCT CERTIFICATION

证书编号：2019051302030446

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河南洛阳市伊滨区科技大道与诸葛大街交叉口路北

生产者（制造商）名称、地址：
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河南洛阳市伊滨区科技大道与诸葛大街交叉口路北

生产企业名称及地址：
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河南洛阳市伊滨区科技大道与诸葛大街交叉口路北

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产品标准和技术要求：
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本证书首次颁发日期：2019年6月6日

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商标：	LandVac V玻
制造商名称：	洛阳兰迪玻璃机器股份有限公司
地址：	河南洛阳市伊滨区科技大道与诸葛大街交叉口路北
生产企业名称：	洛阳兰迪玻璃机器股份有限公司
所在地：	河南洛阳市伊滨区科技大道与诸葛大街交叉口路北
产品名称：	建筑用中空玻璃
认证模式：	产品抽样检验+初始工厂检查+获证后监管
绿色产品指标及评价依据：	见附件
系列规格型号：	具体规格型号及关键原材料见附件
产品标准和技术要求：	产品满足 CTS 07002-2018 《绿色产品评价 建筑玻璃》的 AAA 级要求，其产品涉及的工厂保证能力符合 CTC-TVe-OP02《绿色产品认证实施规则 建筑玻璃》的规定。
绿色产品等级：	AAA 级

发证日期：2019 年 7 月 17 日　　有效期至：2024 年 7 月 16 日

换发日期：*******

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ctc 国检集团

resistance tests. Quality testing includes: air tightness tests and online performance tests.

4. WHICH CERTIFICATION DOES VACUUM INSULATED GLASS NEED TO OBTAIN? WHAT DOES A THIRD-PARTY AUTHORITATIVE CERTIFICATION TELL YOU?

Qualified vacuum insulated glass needs to obtain three types of certification: product performance certification, safety certification, and qualification certification. The performance certification primarily certifies performance regarding thermal insulation, noise reduction, and wind resistance. Safety certificates mainly include: safety glazing product certificate and certification for testing items required by the RoHS directive. Qualification certificates mainly include: 3C certificates and green building materials and products certificates.
Third-party authoritative certification tells you that the vacuum insulated glass product made by the manufacturer is tested and certified concerning its performance, quality, and application.

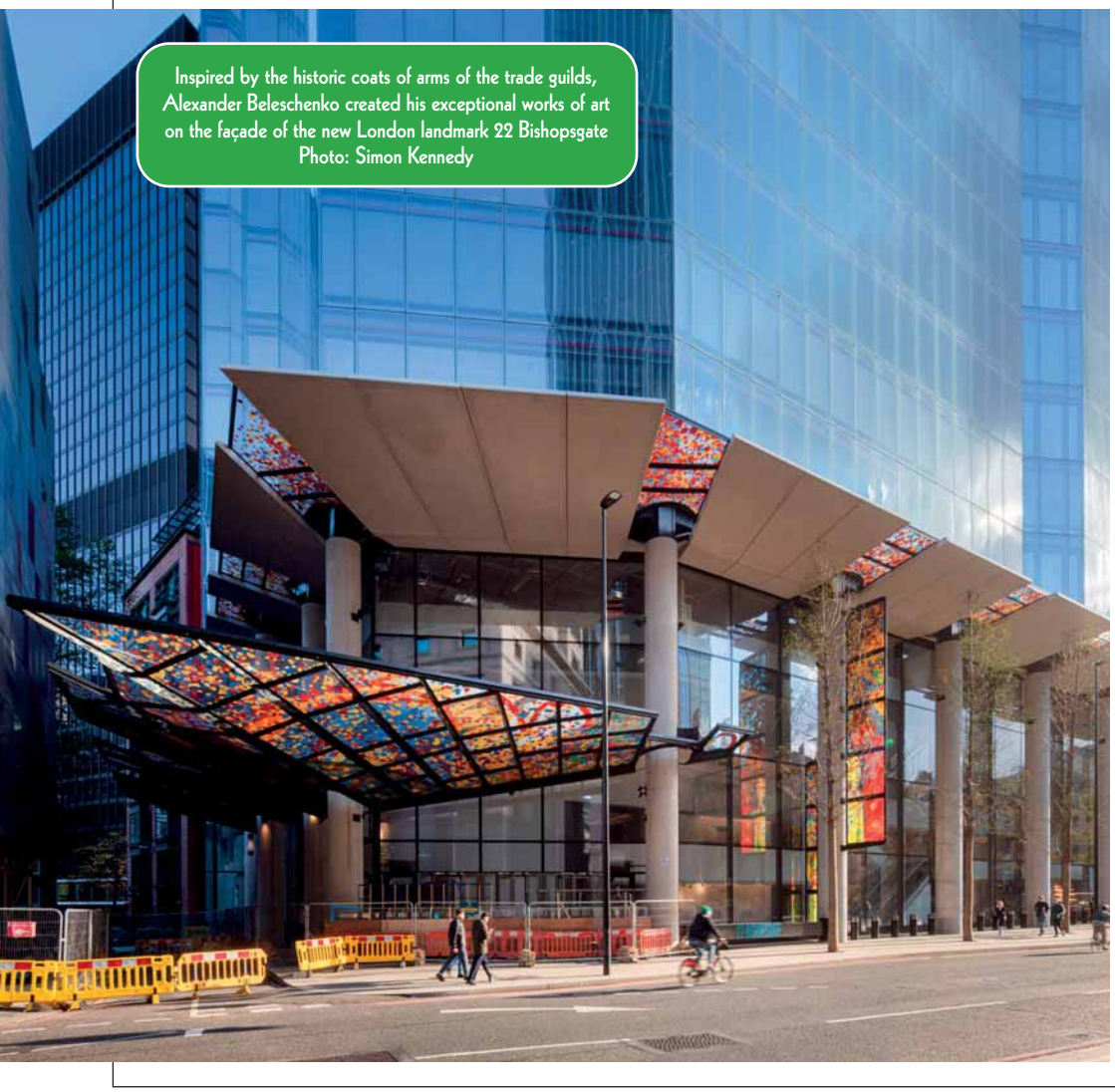
5.WHAT ARE THE BENEFITS OF VACUUM INSULATED GLASS WHEN USING METAL SEALING?

As the melting point of the metal sealing material is low, it will not cause annealing of the tempered glass in the process of edge sealing. Secondly, the metal material has better malleability. When vacuum glass in use is exposed to additional loads caused by temperature differences or other external forces, the metal sealing material can withstand more deformation and maintain a good sealing effect. These benefits of metal sealing make vacuum insulated glass more reliable and provide better performance.

6. HOW CAN WE DETERMINE WHETHER A MANUFACTURER IS A SUPPLIER OF QUALIFIED VACUUM INSULATED GLASS?

First, the manufacturer's vacuum insulated glass products should comply with the requirements of the national standards for vacuum insulated glass. Secondly, the manufacturer should have a well-functioning ISO quality management system. Finally, the manufacturer should have sufficient production capacity and experience with large enterprise applications. As a landmark in high-performance energy-saving glass products, the wide application of vacuum insulated glass will greatly reduce the consumption of building materials and energy, decrease carbon emissions in the construction field, and bring the general public healthy and sustainable quality of life.

SEDAK: a new landmark emerges with artwork by Alexander Beleschenko



Inspired by the historic coats of arms of the trade guilds, Alexander Beleschenko created his exceptional works of art on the façade of the new London landmark 22 Bishopsgate Photo: Simon Kennedy

22 BISHOPSGATE, LONDON: GLASS ART IN THE CONTEXT OF ARCHITECTURE: IMPRESSIVE RIGHT INTO THE DETAIL

Glass canopies consisting of 149 laminates in total, colourfully designed by the artist Alexander Beleschenko, are one of the most characteristic design features of the new London landmark – 22 Bishopgate. In order to print his designs accurately onto glass, a precise printing technique was necessary, and at the same time the glass itself needed to fulfil high technical demands. Alexander Beleschenko, who lives in England but has Ukrainian roots, found this technical competence in Germany, where sedak (Gersthofen) produces safety glass that met the requirements, both in terms of accurate printing and quality.

In the heart of London, 22 Bishopsgate soars 278 meters into the sky. But one of the most characteristic design features of the building is directly above the heads of passers-by: the glass canopies, which consist of 149 laminates in total, colourfully designed by the artist Alexander Beleschenko.

A STRONG, COLOURFUL COUNTERPOINT TO THE COOL METROPOLITAN STEEL AND GLASS ARCHITECTURE

When you walk along underneath the protruding glass roofs of the new London landmark 22 Bishopsgate you find yourself immersed in a joyful interaction of colour and light. The canopies are filled with blue, yellow, orange, red and green geometric shapes, sometimes opaque, sometimes translucent. Equally colour-intensive patterns, like huge brushstrokes on the glass surfaces, can be found on the glass façade and colourfully designed glass elements decorate some of the ceilings in the entrances, serving as friendly indications of where to go.

The lively design is strengthened by the many different formats of the glass. They vary in size and form: quadratic, trapezoid, triangular, free-form. No two glass elements are the same, each is unique, a highly imaginative work of art.

The glass was designed by the internationally renowned artist Alexander Beleschenko, who has been using this material to set identity-creating architectural accents for many years. For 22 Bishopsgate he was inspired by the traditional coats of arms of the trade guilds, which were omnipresent in (old) London. He reinterpreted them in a new, abstract way, thereby connecting modern with historic – a phenomenon that is part of everyday life in the British metropolis.

> Glass is a really powerful medium in the context of architecturally defined space
> *Alexander Beleschenko, artist.*

Extremely high accuracy in printing (resolution up to 1,080 dpi) was the technically decisive criterion for the artist in deciding to commission sedak with the printing
Photo: sedak

ALEXANDER BELESCHENKO ART AND WORKS

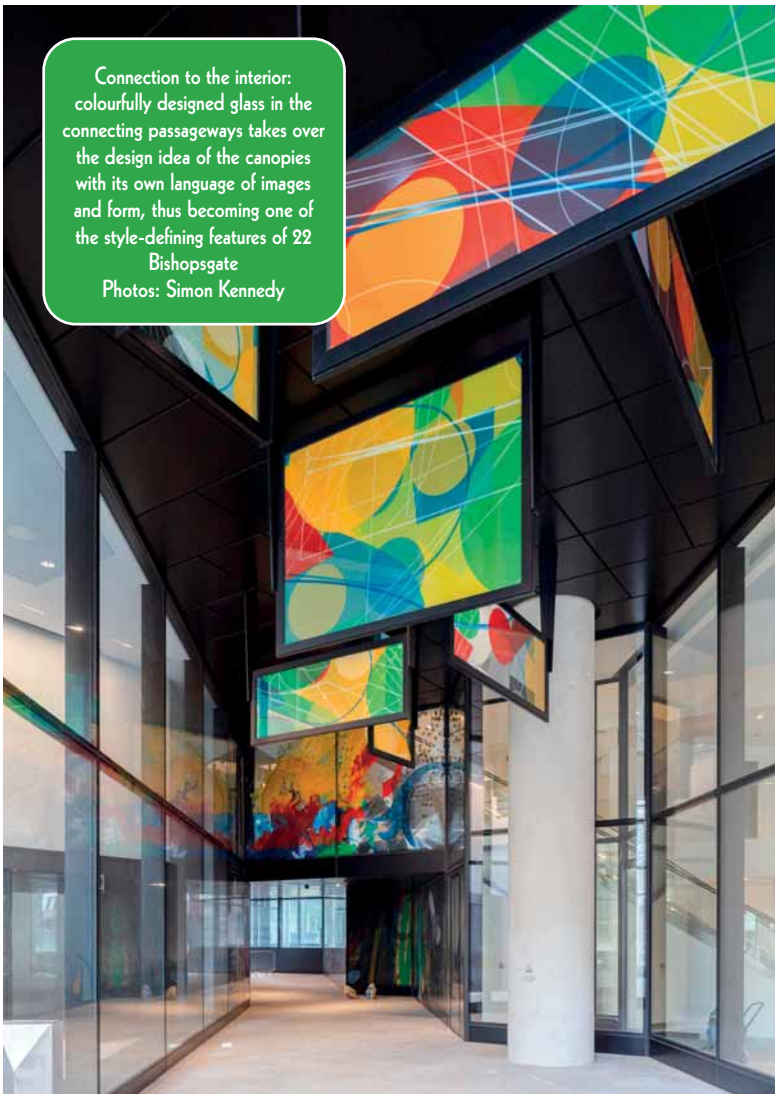
Alexander Beleschenko knows how to design and realize large-scale art in architecture. Nevertheless, it is still a special moment for him when he sees his art installed for the first time – at this scale there is no possibility to check the complete work before it is finished. This makes the close cooperation between the artist and the glass processor especially important. With artistic vision, a feel for 'the big picture' and know-how in working with the material glass and the possible processing technologies, unique works can be created. If everything is realized perfectly, "in a certain way you see the art rather than the technique," said Beleschenko – the impressive result can now be seen in London at 22 Bishopsgate.

CERAMIC DIGITAL PRINTING: THE TECHNIQUE FOR ART

The glass was created using digital printing with six ceramic base colours – the designs consisted of opaque and transparent elements, colour gradients and overlays. It was especially the overlays that enabled a wide diversity of colour nuances to be created from the base colours – also using different thicknesses of the layers. The software had to work just as efficiently as the printer, the data volumes were huge: every piece of glass is unique. Because many of the glass elements have an individual shape, it was not possible just to put them all into the automated transport chains of the sedak production system; some had to be handled using suction equipment.

THE SYMBIOSIS OF TRANSPARENCY AND COLOUR

Using glass for roofs already demands high technical standards (e.g. because of the danger of breakage). What makes the glass elements exceptional in this case is the permanently colour-fast and highly precise printing, realized with a ceramic digital process at a resolution of 1,080 dpi. This level of exactness goes way beyond the usual standard – on printed paper such as you may be holding in your hands right now, 300 dpi is the norm. If you are reading this online, you are probably looking at a screen with 140 dpi resolution (approximately 4K picture quality). Because ceramic colours are especially stable in terms of tone and do not become bleached even under UV radiation, they are ideal for use outdoors. Beleschenko was impressed with the colour stability and especially the extremely high precision: he wanted his space-defining art to have an impact on viewers from a distance as well as up close. This technique enabled him to realize this aim perfectly. The production went really easily for Beleschenko: he sent his (enormous) files directly to the glass processing company sedak. The pane construction:



Connection to the interior: colourfully designed glass in the connecting passageways takes over the design idea of the canopies with its own language of images and form, thus becoming one of the style-defining features of 22 Bishopsgate
Photos: Simon Kennedy

CREDIT BOARDS

Architects: PLP Architecture, London
Owners: 22 Bishopsgate (DEVCO) Ltd, London
Façade construction: Josef Gartner GmbH, Gundelfingen
Glass artwork: Alexander Beleschenko
Glass processor: sedak, Gersthofen (D)

For passers-by it is like walking through a rain of confetti under the printed canopies
Photo: Simon Kennedy

double layer safety glass made from 8 mm low-iron glass (heat-strengthened glass) with digital printing. Artwork in position 2 or 3. As the art extends to the façade, there are also printed insulated glass panes. These are each made from two double laminates (6 mm heat-strengthened glass). They are filled with argon and printed in position 2 or 7. In total, sedak supplied 149 laminates and 370 insulated glass panes.

> Alexander Beleschenko is very emotional and passionate. He was astounded at how precise a print on glass can be. This was very important for his motifs
> *Ralf Scheurer, sales, sedak.*

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SEDAK – LEADING GLASS

Since its founding in 2007, Germany-based company sedak has used its pioneering spirit to establish itself as a premium manufacturer of large-format insulated and safety glass. sedak has evolved their glass as a construction material for all-glass facades and roofs. Iconic facades and buildings are created with an unprecedented degree of transparency thanks to superior quality of innovative products.

sedak manufactures single-pane glass units, multi-layer glazing and functional insulated glass units in formats up to 3.6 x 20 meters in an efficient, highly automated system. Raw glass is treated, strengthened, laminated, printed, lamination-curved and assembled into insulated glass with a unique set of machinery that spreads over a production area measuring 35,000 sq.m. Since integrating Italian-based Sunglass Industry srl, who are the specialist in curved glass, sedak's core expertise also now includes hot bending glass. The specialist also supplies exceptional solutions for luxury yachts with optimized glass for use on the high seas.

The glass fabricator particularly demonstrates its solution-oriented expertise in special designs. Thanks to its research and development spirit, new technologies and the expertise of its 190 employees, sedak is constantly advancing innovations in glass finishing and sees itself as a partner to architects, developers, facade builders and metalwork companies. As a specialist in oversized and extremely heavy glass, the company develops future-oriented solutions to implement customers visions with a flexible approach. The glass fabricator acts as a full-service supplier – from the initial order to final delivery. sedak thus helps advance tomorrow's visionary architecture today.

MAZZAROPPI: A history of passion and excellence

Federico Mazzaroppi, Marketing Director & Antonio Mazzaroppi Managing Director

Giuseppe Mazzaroppi was the kind of man that had to excel at everything he did. Keen, curious and methodical, if he set his mind on a project or venture he had to see it through, not only to completion but to success. Therefore, when, in the late 1950s, he developed a fascination for glass-processing, it was only natural for him to want to become the best in the field.

The 1950s were a time of dazzling innovation and mind-blowing progress and, in the span of a few years, Giuseppe's company

Founded back in the 1950s, Mazzaroppi is now in its third generation. In this article, Antonio Mazzaroppi, the son of the company's founder, speaks about the history, passion and for excellence in the development of increasingly innovative and revolutionary machinery that the company and its staff continue to have.

went from basic machinery for the vertical tempering of flat glass to more complex machines such as glass bending furnaces. From 1980, his son Antonio – currently the company's Managing Director – began to design increasingly innovative and revolutionary machinery and, as of 2019, Antonio's son Federico also joined the firm.

Sixty years and three generations later, his heirs still maintain his same passion for excellence, and Mazzaroppi – still a family-run business – has become a household name in the field of glass tempering and bending machines, combining the Italian passion for craftsmanship, human relationships and attention to detail with the most advanced technology and constant research and innovation.

INNOVATION AND TRADITION

How does any company thrive and grow through decades of momentous change, in an increasingly competitive market? Making outstanding products, experimenting, patenting innovations, and never compromising on quality are indispensable prerequisites, but they are not enough. We believe in nurturing our relationship with each client, not just aiming for individual sales, but looking for partners that will share decades of history with us. Each of our machines is designed to last 20 to 30 years and we are committed to providing assistance to our clients at any time, while they are using our products. We are always available for technical support, we listen to feedback and suggestions, and strive to make each new generation of our products more fitting to our clients' needs. The service we offer is tailored to each client's specific requirements and evolves to match these requirements as they carve their own path to growth and success. Consistently turning each new client into a life-long business partner is a trademark feature of our style.

ALWAYS PRESENT

Mazzaroppi's identity is firmly rooted in the company's history: we stand for reliable quality, constant research and outstanding customer service. Everything else that might be said about our brand comes from these three qualities, which we are proud to see reflected in our clients' feedback and reviews. Each of our systems is designed to meet the specific needs of our clients and to offer substantial benefits in terms of energy savings, user friendliness and optimisation of space and investment, all while delivering consistently superior performance.

THE FUTURE OF GLASS TEMPERING

As our industry changes, we strive to design and produce machines that will shape its future, combining craftsmanship and innovation. Once again, we model our priorities on our clients' needs and on the ever-changing context in which they operate. Saving on energy consumption not only makes glass processing more sustainable, it also allows our clients to save significant amounts, thus improving their bottom line. This has pushed us to improve our pre-existing lines and design furnaces that can reach 680°C in one hour on the first day of use and in half an hour after that, which allows our clients to switch their furnace off at night or over the weekend, thus avoiding electricity consumption during unproductive hours.

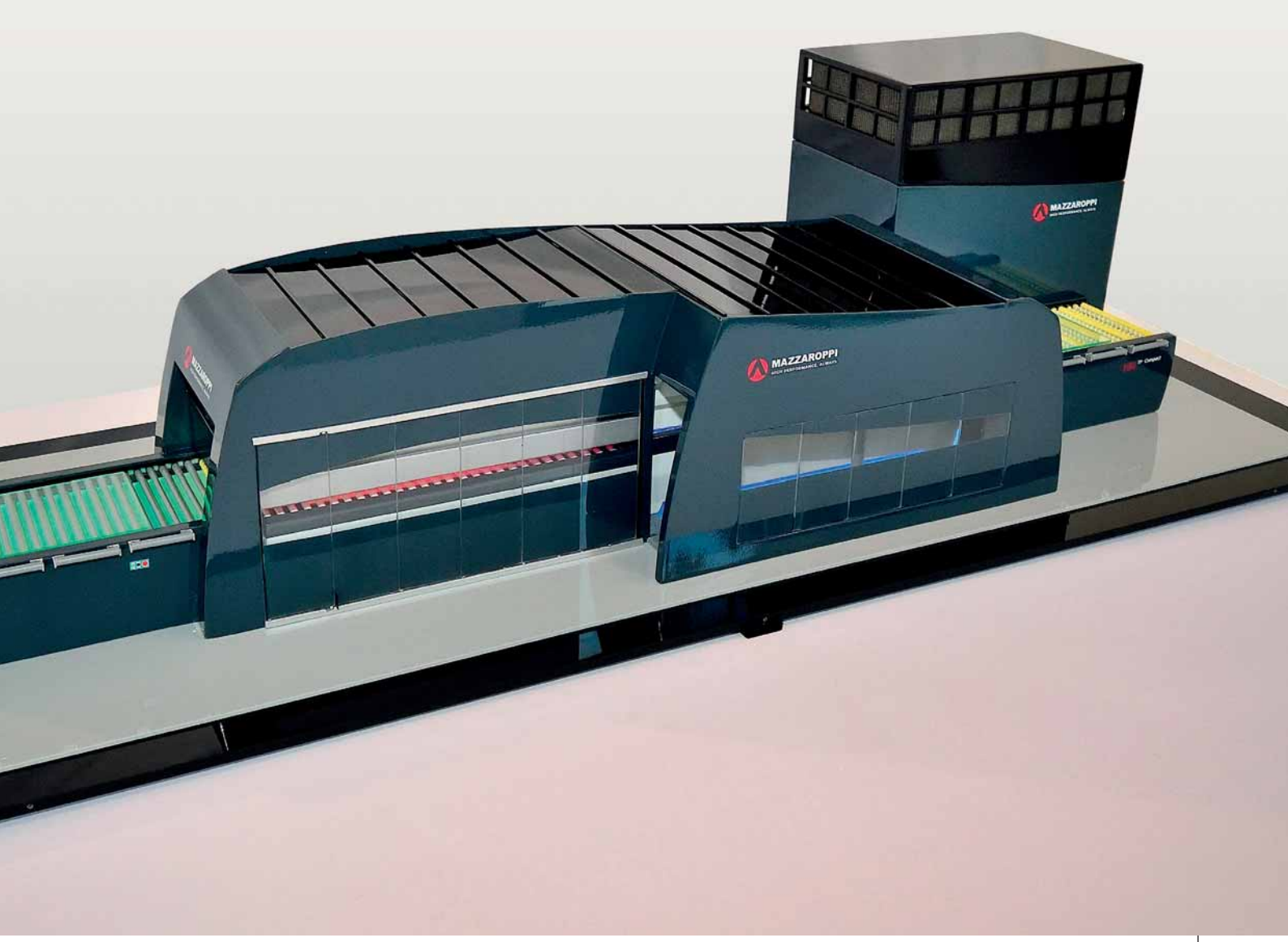
DEDICATED TO MAKING GLASSMAKERS' LIVES EASIER

Making sure our machines are an excellent investment is a pillar of our strategy: we want our products to be accessible by small- and medium-sized companies, so that they won't have to rely on third-party services for high-quality glass tempering or lamination. We carry out a production analysis in order to always provide the most suitable solution when we receive orders. Driven by the same desire to make our clients' journey easier and more productive, we make our machines easy to operate without the need for special training. In fact, the whole process of shipping and installation is carried out in approximately two weeks, and includes employee training by our personnel. Our interfaces are extremely intuitive and accessible through a dedicated service app.

All our machines are made from 100 per cent European components and materials of guaranteed quality. This makes our products reliable and durable, with minimal maintenance requirements. In addition, our systems are designed so that installed components are easily accessible to technicians, which makes downtime very rare and allows repairs to be carried out quickly.

Our company is developing into a creative workshop, where extraordinary machines are conceived, developed, designed, and built, both as part of our standard lines, as well as customised to meet specific client requirements.

All our machines are the result of old-fashioned craftsmanship, set in a context of ultra-modern industrialisation. In 2018, for instance, we launched a new generation of patented furnaces for glass lamination, and in 2021, after further reducing the energy consumption of our older models, we inaugurated a new generation of compact furnaces for flat glass tempering.



NEW TP COMPACT

Picture a glass-tempering machine so compact it can fit into a small glassworks, allowing this same glassworks to take care of the whole tempering process without outsourcing any operations and, at the same time, so flexible and efficient that it can ensure the best quality on the market with energy consumption lower than any other.
Now picture being able to operate such a machine without the need for any specific training, through an interface as user-friendly and intuitive as that of a smartphone. Meet the new TP Compact by Mazzaroppi: everything you wanted from a glass-tempering machine and more, brought to you by the experience and vision of our creative workshop.

High-tech meets craftmanship

Craftsmanship is at the heart of our brand philosophy, which is why we always strive to meet our customers' needs for complete control over every stage of glass processing. The new TP Compact was created thanks to the intersection of craftsmanship and innovation.
The TP Compact stands out from all other tempering furnaces, not only because of its elegant and compact design – with an overall length of around 17-18 metres – and the exceptional quality of its output, but also because of its mission, the very reason why it was created, which is to make our customers' work easier, faster and ultimately better.

No more outsourcing glass tempering

We designed the TP Compact especially for small and medium-sized glassworks that would like to have their own furnace, but do not have the production capacity to justify the purchase of a standard 2,500x5,000 mm tempering furnace. This forces them to rely on third parties, losing control over the pace and quality of their production. The TP Compact is accessible to such companies because of its small size and because it has an average consumption of around 100-120 kWh. We have reduced consumption by a further 30 per cent compared to our previous model, which amounts to half the consumption of our European competitors and a third of that of our Asian competitors. This makes the TP Compact an investment that translates into huge savings in the long run, since it allows to slash energy costs both in terms of consumption and of fixed rates, as well as the starting cost of infrastructural installation.

Special patent and high quality materials

Thanks to our special patent and high quality ma-

terials, the system reaches an operating temperature of 680°C in 60 minutes when it is first switched on, and in 30 minutes at each subsequent session. This allows you to switch it off at night or over the weekend and switch it on again when you need it, rather than wasting your resources on electricity that does not contribute to your production. This eliminates the cost of maintaining the furnace temperature and makes the TP Compact not only cost effective, but more sustainable than any other tempering machine on the market.

User-friendly and ready-to-roll

Your personnel will not need special training to operate this machine: the whole process can be controlled via a touch-screen monitor with an extremely intuitive and user-friendly interface. The operator simply selects a previously compiled set of parameters and associate it with a track. The TP Compact needs no further input. It is also extremely easy to tweak parameters such as glass thickness during production. This means you will be able to change the glass thickness on every trolley run without having to stop the machine or wait for the temperature to adjust. All parameters are adapted automatically to match the required settings.

SPECIAL FEATURES

The TP Compact's heating section is entirely managed by our software, which regulates the zones in the furnace independently. Each zone is equipped with its own resistance, thermocouple, static relay, fuse, and dedicated temperature control channel.
The heating elements in the lower heating chamber are protected by steel panels, which shield them in the event of glass breakages in the furnace, and are designed to prevent glass fragments from reaching and damaging the heating elements, without interfering with the direct heating of the glass itself.
The loading section boasts a horizontal glass lifter for easier and safer loading and special non-marking rolls. The roll movement is made more regular and precise by synchronised mechanical transmission.
The TP Compact is made in three standard sizes: 1,300x2,600, 1,300x3,200(3,600), and 1,600x3,200(3,600), and the whole installation process, managed by our team, takes 15 days, which include all the training your staff will ever need to operate the machine safely and effectively. It can handle any glass thickness between 3.8(4) mm and 19 mm and can temper any type of flat glass (float, reflective, enamelled, screen-printed, and processed, and including low-emissivity glass).

REMOTE SUPPORT WHENEVER NEEDED

Mazzaroppi's approach is entirely customer-focused: we like to think of our customers as partners that embark with us on a journey that we hope will last for decades. Therefore, we pay special attention to after-sale support and customer care, making sure our customers can rely on us at any time.
All our plants are remotely connected to our operations centre, where specialized technicians respond to customer needs, and monitor each machine individually, providing real-time advice to operators on how to improve quality or speed up the workflow, as well as intervening immediately in the event of faults or anomalies.

VITRUM 2021

TP Compact will allow you to manage glass-tempering in your own glassworks in an affordable and sustainable way, without compromising on quality. We will be at Vitrum 2021, the international trade show that will take place at Fiera Rho, in Milan, 5-8 October with our new TP Compact in operation.
Our team will be present to answer questions and listen to feedback and requirements, in order to offer you bespoke solutions.

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VDMA: no chance for viruses – special glass makes disinfection superfluous

Glass surfaces can be pre-treated so that they do not offer bacteria and viruses a chance to survive and do not aggregate layers of dirt. This article takes a look at the results of the latest industry working group of the Glass Technology Forum, which dealt exclusively with glass surfaces and their specific properties.

The latest industry working group of the Glass Technology Forum dealt exclusively with glass surfaces and their specific properties, which are permanently under the influence of their environment, especially when people come into contact with glass surfaces. Touching and swiping, along with skin grease, cosmetics, or disinfectants, can all leave traces and thus also viruses and bacteria. A special coating can prevent them from surviving on the surface.

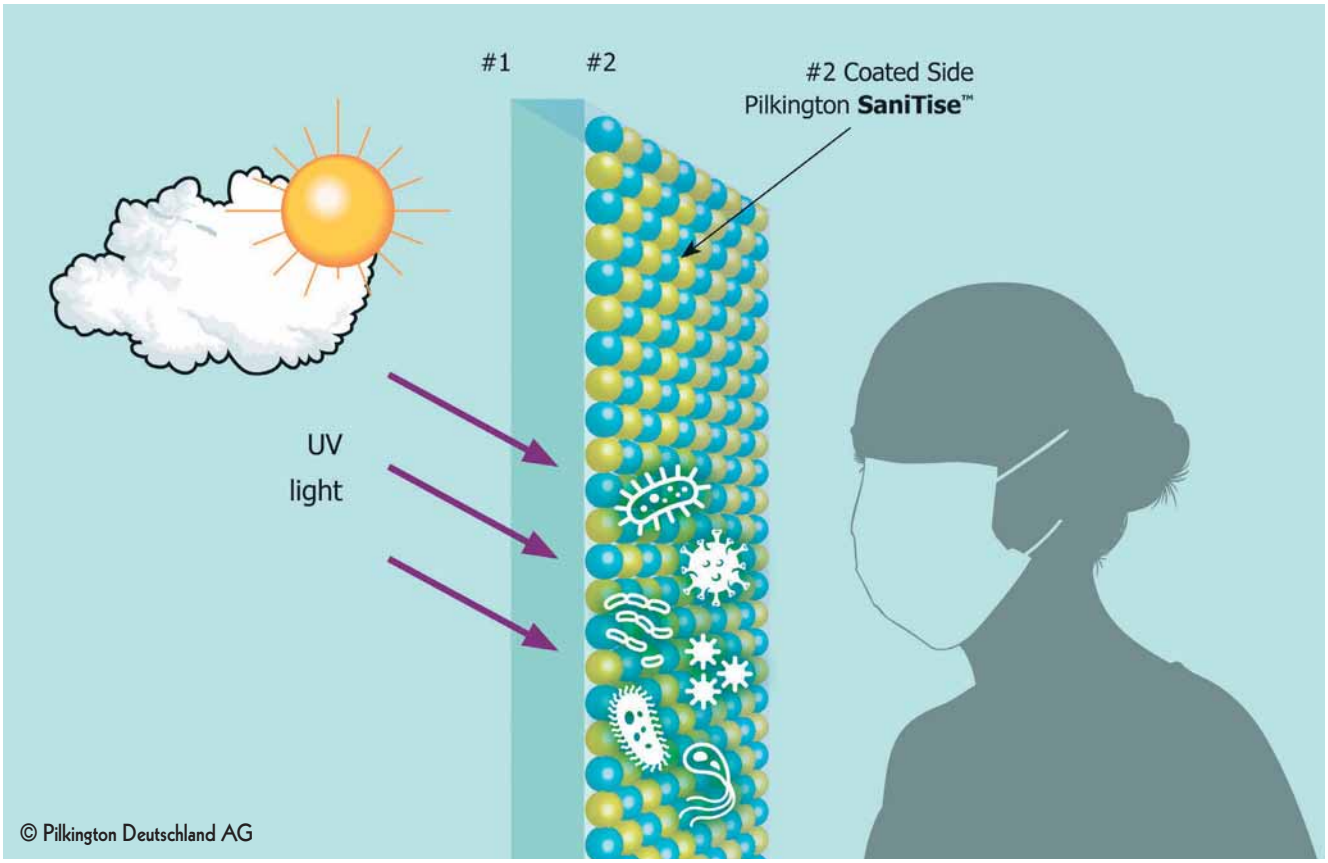
Glasses like these from the NSG Group are used in the medical sector or are part of interior design. Furniture surfaces lend themselves to this, especially in places with much public traffic. The glass type SaniTise™ from Pilkington contains a coating based on titanium dioxide, TiO2. This is applied in a CVD process at 600°C during float glass production. The photocatalytic effect is triggered by UV light. Sunlight destroys 90 per cent of the viruses on the surface after about 15 minutes. An 'accumulator effect' means that about 80 per cent of the viruses are still devastated after 60 minutes. Additional UV light sources are necessary indoors. The layer is active for the glass' life and does not restrict further processing steps in the manufacturing process. Since it is very thin, the glass can be recycled.

With laminated glass, the film used must be UV-permeable. If the active surface gets a print afterward, the effect is reduced because the printed area can no longer reduce the virus load. Special cleaning agents are not necessary.

Another possibility for creating an antibacterial function is offered by the process of HEGLA Boraident GmbH & Co KG. A laser does heat the glass surface and initiates the transfer of silver ions from a transfer medium on the glass surface into the glass surface. Silver ions are known to kill bacteria that get onto the glass surface through skin contact. The process can be used, for instance, to treat glass in the area of handles or other surfaces that are frequently touched.

REACTIONS OF GLASS SURFACES TO THE ENVIRONMENT

In general, glasses react to external influences. 95 per cent of the glasses that are used are silicate glasses. Due to the hybridization state, the SiO2 ensures that a three-dimensionally linked silicate network with four bonding arms is created. This is hard to dissolve. Nevertheless, the surface reacts impressively – if new



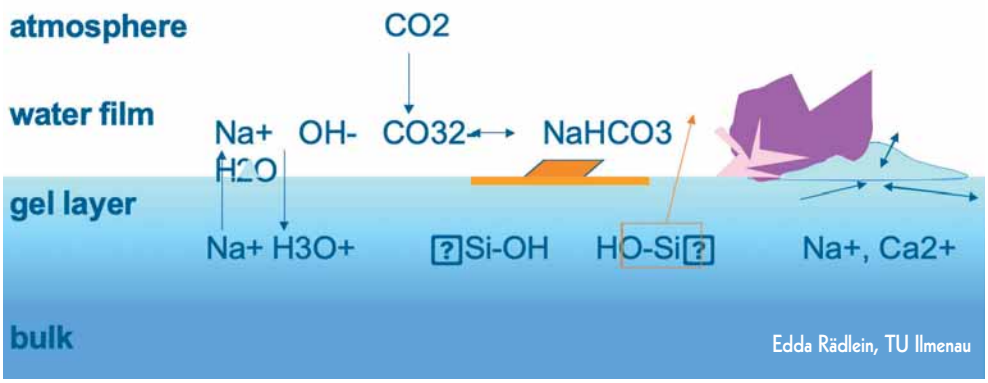
surfaces form, loose and thus reactive bonds are present. This is also reflected in the strength: the smallest defective spots in the surface cause brittle fractures when tensile stress occurs. Consequently, it is helpful to introduce compressive stresses into the surface. This is done, for example, via chemical or thermal pre-stressing.

The glass surfaces change over time. In particular, the reaction with moisture damages the surface ('deficient water attack'). A gel layer forms in which, on the one hand, crystallization takes place, but which, on the other hand, can act as a protective layer depending on time. Why these gel layer bumps form has not yet been explained. The TU Ilmenau is also researching this. Sodium hydrogen carbonates are often found there. The weathered and dried gel layer can flake off over a large area and reveal a new glass surface. In the daily environment, we encounter glass surface reactions, especially in the dishwasher, but external environmental conditions such as dust or sand also show great effects.

COATINGS REQUIRE BETTER ADHESION PROPERTIES

The gel layer that develops during the ageing and corrosion process requires glass to be pretreated before printing or coating. This is a core competency of SURA Instruments GmbH.

One possibility is to silicatise the surface using pyrosil technology. This involves burning a gas mixture with a precursor containing silicon. A silicate network



with a high number of OH groups is formed. The result is a hydrophilic layer on which the water contact angle is reduced to values between 0 and 5 degrees. This is important for the application of lacquers or adhesives, but it also affects the reflectance of the surface.

Digital printing, especially with organic, fast-curing inks, is becoming increasingly important. This process enables the smallest batch sizes and the highest degree of individualization. Unfortunately, organic inks are very sensitive and do not contain an adhesion promoter. A mechanical bond by clinging to the surface is usually not present in glasses. Physical bonds are always present (dipole forces, hydrogen bonding) but are not sufficient to ensure long-term adhesion. Chemical bonds, however, (covalent bonds) can arise when impurities and absorption layers are removed.

The best basis for coatings is the juvenile glass surface. Older glass must be pre-treated. Flaming is one possibility; it can clean the surface and, depending on the process, remove the cold end coating at the same time. The adhesion strength increases significantly with adhesion promoters, and the fracture pattern no longer shows adhesion failure.

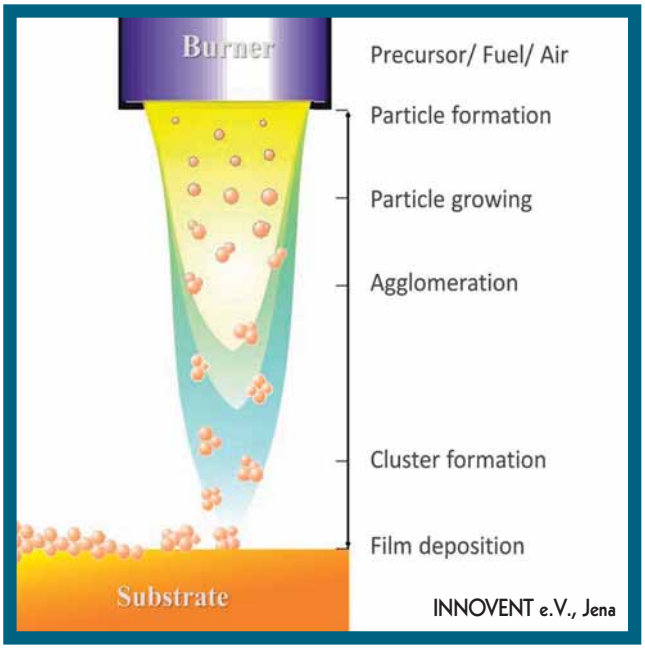
BETTER NOT TO TOUCH – MECHANICAL STRESS ON DISPLAYS

Touch, swipe, and zoom not only generate abrasion but also leave skin grease, cosmetics, or disinfectants on displays. The Institute for Surface and Product Analysis (ISPA) investigates and tests the effects. Humans cannot see changes on the surface that are smaller than 40 μm. The fingertip, however, can feel changes up to 1 μm in size. The speed of the movement is decisive for the magnitude of the damage. Mechanical stress tests often do not reflect reality because they are performed too slowly.

An established standard test is the ABREX® Abrasion Test. It simulates the contact of a viscoelastic, rough, and inhomogeneous finger surface and can take into account various solids and liquids as well as temperature ranges. The contact angle of 45 degrees is particularly important. Depending on the requirements in the end application, different load levels and speeds are used. These and other test methods have been tested and further developed by the German Flat Panel Display Forum. An evaluation of the test result is carried out by measuring the contact angle.

VDMA

The VDMA represents around 3,300 German and European mechanical and plant engineering companies. The industry stands for innovation, export orientation, medium-sized businesses and employs around four million people in Europe, more than one million of them in Germany alone.



IMPORTANT LINKS:

glass.vdma.org
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SATINAL STRATO - TK	www.satinalgroup.com

COMPANY	website
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Goldglass Technologies
Guangdong Northglass & Juisun Technology Industrial
Hegla
IOCCO Group
Italcarrelli
Keraglass
Lisec Group
Schiavo
Torgauer Maschinenbau
Turomas

HANDLING ROBOTS

Ashton Industrial Sales
Bavelloni
Bottero
CMS
ECOL
Hegla
IOCCO Group
Lisec Group
Schiavo
Torgauer Maschinenbau
Turomas

HANDLING EQUIPMENT FOR FLOAT GLASS

Bovone Elett.
Bottero
Di Gregorio
ECOL
Glaston Group
Goldglass Technologies
Hegla
IOCCO Group
Italcarrelli
Lisec Group
Schiavo
Torgauer Maschinenbau
Turomas

TROLLEYS AND CLASSIFIERS

CMS
Di Gregorio
Forel
Hegla
Lisec Group
MOVETRO
Schiavo
Si.Ste
Tecno Glass
Torgauer Maschinenbau
Turomas

TRANSPORTATION SYSTEMS/ TRUCKS

Giardina Finishing + HS Glassprinting
Hegla
Italcarrelli
Lisec Group
Schiavo

VACUUM LIFTING EQUIPMENT

Bottero
CMS
Di Gregorio
ECOL
Fenzi
Forel
Glaston Group
Hegla
Lisec Group
Schiavo
Si.Ste
Torgauer Maschinenbau
Turomas

CRANE SUCTION CUPS FOR LARGE SHEETS

Bottero
Di Gregorio
Fenzi
Glaston Group
Hegla
Lisec Group
Schiavo
Turomas

TRANSPORTATION TONGS

Bottero
Fenzi
IOCCO Group
Schiavo
Turomas

SUCTION CUPS

ADI
Bottero
CMS
Fenzi
Glaston Group
Hegla
Schiavo
Si.Ste
Turomas

CONVEYOR BELTS

Ashton Industrial Sales
Cugher Glass
Di Gregorio
ECOL
Glaston Group
Schiavo
Turomas

PACKAGING MATERIALS AND SYSTEMS

ECOL
Hegla
Schiavo
Vismara

ACCESSORIES

Bottero
CMS
Fenzi
Hegla
Helios Quartz
Mole Moreschi
Schiavo
Turomas

Straight-edge and shape cutting

COMPLETE STRAIGHT-EDGE LINES

Bando Kiko
Bavelloni
Bottero
CMS
Euromec
Forvet
Glaston Group
Hegla
Lisec Group
Schiavo
Schiatti Angelo
Shanghai North Glass Technology

COMPLETE SHAPE CUTTING LINES

Bando Kiko
Bavelloni
Bottero
CMS
Glaston Group
Guangdong Northglass & Juisun Technology Industrial
Hegla
Lisec Group
Schiavo
Shanghai North Glass Technology
Turomas

AUTOMATIC CUTTING MACHINES FOR AUTOMOTIVE GLASS

Bando Kiko
Bottero
CMS
Glaston Group
IOCCO Group
Lisec Group
Schiavo

LOADING AND TILTING MACHINES

Bando Kiko
Bavelloni
Bottero
CMS
ECOL
Euromec
Forel
Glass Company
Glaston Group
Hegla
Intermac - Biesse
IOCCO Group
Lisec Group
Schiavo
Tenon (Beijing) Equipment
Turomas

CUTTING TABLES

Bando Kiko
Bavelloni
Bottero
CMS
Euromec
Fenzi
Forel
Glaston Group
Hegla
IOCCO Group
Lisec Group
Macotec
Schiavo
Tekno Kilns
Tenon (Beijing) Equipment
Triulzi
Turomas

CUTTING OPTIMIZERS

Bando Kiko
Bavelloni
Bottero
CMS
Deltamax Automazione
Euromec
Forel
Glaston Group
Hegla
IOCCO Group
Lisec Group
Optima
Schiavo
Turomas

CUTTING PATH OPTIMIZERS

Bando Kiko
Bottero
CMS
Euromec
Glaston Group
IOCCO Group
Lisec Group
Optima
Schiavo

CAD SYSTEMS

Bavelloni
CMS
Lisec Group
Prodim
Schiavo

ARMOURED AND LAMINATED GLASS CUTTING MACHINES

Bando Kiko
Bavelloni
Bottero
CMS
Glaston Group
Hegla
Lisec Group
Schiavo
Turomas

ROUND OR SHAPE CUTTING MACHINES

Bando Kiko
Bavelloni
Bottero
CMS
Fenzi
Glaston Group
Hegla
Lisec Group
Schiavo
Turomas

CUTTING ACCESSORIES

ADI
Ayrox
Bando Kiko
Bottero
Fenzi
IOCCO Group
Schiavo
Softeco
Talamoni
Turomas
Vincent

SAW MACHINES

Di Gregorio
Schiavo
Tecno Glass

AUTOMATIC SAWS FOR CUTTING LAMINATED AND BULLET-PROOF GLASS

CMS
Schiavo

BREAKING SYSTEMS

Bando Kiko
Bavelloni
Bottero
CMS
Euromec
Glaston Group
Hegla
IOCCO Group
Lisec Group
Schiavo
Turomas

CUTTING MACHINES WITH BREAKING AND EDGE DELETING DEVICES

Bando Kiko
Bottero
CMS
Euromec
Glaston Group
Guangdong Northglass & Juisun Technology Industrial
Hegla
IOCCO Group
Lisec Group
Schiavo
Turomas

GLASS CUTTING FLUIDS

Diamant - AR Nunziata
Schiavo
Turomas

ACCESSORIES

Schiavo
Schiatti Angelo
Talamoni
Turomas

Edging and bevelling

COMPLETE EDGING LINES

Adelio Lattuada
Ashton Industrial Sales
B Solution
Bando Kiko
Bavelloni
Bottero
CMS
Forel
Forvet
Hiseng Glass Machinery
IOCCO Group
Schiavo
Schiatti Angelo
SKG - Skill Glass

COMPLETE BEVELLING LINES

Adelio Lattuada
Bando Kiko
Bottero
CMS
Hiseng Glass Machinery
IOCCO Group
Schiavo

COMPLETE AUTOMOTIVE GLASS EDGING AND BEVELLING LINES

Adelio Lattuada
Bando Kiko
Bavelloni
Bottero
Glaston Group
Hiseng Glass Machinery
Intermac - Biesse
IOCCO Group
SKG - Skill Glass

DOUBLE-EDGE GRINDING MACHINES

Ashton Industrial Sales
B Solution
Bando Kiko
Bavelloni
Bottero
CMS
Forvet
Hiseng Glass Machinery
Intermac - Biesse
IOCCO Group
Schiatti Angelo

VERTICAL-EDGE GRINDING MACHINES

Adelio Lattuada
B Solution
Bando Kiko
Bavelloni
Bottero
Di Gregorio
Forel
Glass Company
Glaston Group
Hiseng Glass Machinery
Schiavo
Schiatti Angelo
SGM - Special Glass Machinery
Shanghai North Glass Technology
SKG - Skill Glass

GRINDING SPINDLES

Schiavo
Tecno Glass

BEVELLING MACHINES FOR ROUND AND SHAPED GLASS

Adelio Lattuada
Bando Kiko
Bavelloni
CMS
Hiseng Glass Machinery
Intermac - Biesse
Schiavo

STRAIGHT-EDGE BEVELLING MACHINES

Adelio Lattuada
Bando Kiko
Bavelloni
Bovone Elett.
CMS
Glass Company
Hiseng Glass Machinery
Schiavo
Schiatti Angelo

BEVEL POLISHING MACHINES

Adelio Lattuada
Bando Kiko
Bavelloni
Bovone Elett.
CMS
Hiseng Glass Machinery
Intermac - Biesse

STRAIGHT-EDGE ENGRAVING MACHINES

Bavelloni
Bottero
CMS
Intermac - Biesse
SKG - Skill Glass

SHAPED GLASS ENGRAVING MACHINES

Bavelloni
Bottero
CMS
Intermac - Biesse

CORNER GRINDING MACHINES

Adelio Lattuada
Ashton Industrial Sales
B Solution
Bavelloni
CMS
Intermac - Biesse
SGM - Special Glass Machinery
SKG - Skill Glass

SHAPED GLASS GRINDING MACHINES

Adelio Lattuada
Ashton Industrial Sales
Bando Kiko
Bavelloni
Bottero
CMS
Forel
Glass Company
Guangdong Northglass & Juisun Technology Industrial
Hiseng Glass Machinery
Intermac - Biesse

BELT GRINDING MACHINES

Adelio Lattuada
Ashton Industrial Sales
Fenzi
Hiseng Glass Machinery
IOCCO Group
Si.Ste
Tenon (Beijing) Equipment

LATHES - VERTICAL AND HORIZONTAL

CMS
Fenzi

EMBOSSING MACHINES

CMS
Fenzi

PORTABLE MACHINES

Fenzi
Helios Quartz
Si.Ste
Tecno Glass

DIAMOND TOOLS

Adelio Lattuada
ADI
Ashton Industrial Sales
Bando Kiko
Bovone Diamond Tools
Bottero
Diamant - AR Nunziata

Diamut - Biesse
Fenzi
Glaston Group
Marrose Abrasive
Mole Moreschi
Schiavo
Talamoni
Vincent

DIAMOND BELTS

Mole Moreschi

SEAMING LINES

Ashton Industrial Sales

MANUAL LINES

Ashton Industrial Sales

POLISHING WHEELS

Adelio Lattuada
ADI
Bando Kiko
Bovone Diamond Tools
Diamant - AR Nunziata
Diamut - Biesse
Fenzi
Glaston Group
Italmole
Marrose Abrasive
Mole Moreschi
RBM Italia
Schiavo
Si.Ste
Vincent

POLISHING AGENTS AND OXIDES

ADI
Bovone Diamond Tools
Diamant - AR Nunziata
Fenzi
Schiavo
Vincent

POLISHING BELTS

Diamant - AR Nunziata
Di Gregorio
Fenzi
Schiavo
Si.Ste

COOLANTS

Adelio Lattuada
Bovone Diamond Tools
Fenzi
Schiavo

GLASS GRINDING AND BEVELLING COOLANTS

Schiavo

SEPARATORS FOR GLASS-SOLIDS

Ashton Industrial Sales
Dieffe Macchine
Filtraglass
Schiavo
Vitrosep

ACCESSORIES

ADI
CMS
Fenzi
Helios Quartz
IOCCO Group
Mole Moreschi
Schiavo
Schiatti Angelo
Vincent

Washing

HORIZONTAL WASHING MACHINES

Ashton Industrial Sales
Bando Kiko
Bavelloni
Bovone Elett.
Di Gregorio
ECOL
Forel
Glass Company
Glaston Group
Hiseng Glass Machinery
IOCCO Group
Lisec Group
Neptun
Schiavo
SGM - Special Glass Machinery
Si.Ste
Triulzi

VERTICAL WASHING MACHINES

Adelio Lattuada
Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
ECOL
Forel
Glass Company
Glaston Group
Hiseng Glass Machinery
IOCCO Group
Lisec Group
Neptun
Schiavo
SGM - Special Glass Machinery
Shanghai North Glass Technology
Si.Ste
S.T. Group
Stefiglass
Tenon (Beijing) Equipment
Triulzi

WASHING MACHINES FOR AUTOMOTIVE GLASS

Bando Kiko
ECOL
Glaston Group
IOCCO Group
Triulzi

WASHING PURIFICATION SYSTEMS

Dieffe Macchine
Forel
Glass Company
Glaston Group
IOCCO Group
Schiavo
Tenon (Beijing) Equipment

LIQUID WASHING CONCENTRATES

Diamant - AR Nunziata
Schiavo

ACCESSORIES

Helios Quartz
Idrotecnica
Schiavo
S.T. Group

Mirror production

COMPLETE PLANTS & CONVEYORS FOR MIRROR PRODUCTION

Bovone Elett.
IOCCO Group
Triulzi

PAINTING EQUIPMENT

Fenzi
Giardina Finishing + HS Glassprinting
Goldglass Technologies
IOCCO Group
Triulzi

DRYING OVENS

Bovone Elett.
CMS
Giardina Finishing + HS Glassprinting
Goldglass Technologies

AUTOMOTIVE MIRROR BENDING FURNACES

Bovone Elett.

MANUAL SILVER- SPRAYING EQUIPMENT

Fenzi
Glass Company

PAINTS AND CHEMICAL PRODUCTS

Fenzi

ACCESSORIES

Fenzi
Helios Quartz

Insulating glass

COMPLETE INSULATING GLASS LINES

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Forel
Glass Company
Glaston Group
Neptun
Schiavo
SGM - Special Glass Machinery
S.T. Group
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

AUTOMATIC SEALING LINES

Bavelloni
Forel
Glaston Group
Lisec Group
S.T. Group

AUTOMATIC SPACER BENDING MACHINES

Bavelloni
Best Makina
Fenzi
Forel
Glaston Group
IOCCO Group
Lisec Group
Lombarda Macchine
Schiavo
S.T. Group
Tenon (Beijing) Equipment
Thermoseal Group

DESICCANT SALT FILLING MACHINES

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Fenzi
Forel

Glaston Group
Lisec Group
Lombarda Macchine
Neptun
Schiavo
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

SPACER CUTTING SAWS

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Fenzi
Forel
Lisec Group
Neptun
Schiavo
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Thermoseal Group

BUTYL EXTRUDERS

Bavelloni
Best Makina
Di Gregorio
Forel
Glaston Group
Lisec Group
Neptun
Schiavo
Si.Ste
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

HOT-MELT EXTRUDERS

Bavelloni
Best Makina
Di Gregorio
Fenzi
Forel
Lisec Group
Neptun
Schiavo
Si.Ste
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

POLYURETHANE EXTRUDERS

Bavelloni
Best Makina
Fenzi
Forel
Glaston Group
Lisec Group
Schiavo
S.T. Group
Tecno Glass

POLYURETHANE ENCAPSULATION

Glaston Group
Lisec Group
Schiavo

SILICONE EXTRUDERS

Best Makina
Di Gregorio
Fenzi
Forel
Glaston Group
Lisec Group
Schiavo
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Triulzi

POLYSULPHIDE SEALANT EXTRUDERS

Best Makina
Fenzi
Forel
Glaston Group
Lisec Group
Schiavo
Tecno Glass
Tenon (Beijing) Equipment
Triulzi

GAS FILLING EQUIPMENT

Di Gregorio
Fenzi
Forel
Glaston Group
Lisec Group
Neptun
Schiavo
Si.Ste
Sparklike
S.T. Group
Tecno Glass
Tenon (Beijing) Equipment
Thermoseal Group

DESICCANT SALTS

Ashton Industrial Sales
Di Gregorio
Fenzi
Neptun
Schiavo
S.T. Group
Tecno Glass
Thermoseal Group

SPACERS/PROFILES

Ashton Industrial Sales
Edgetech Europe
Fenzi
Schiavo
S.T. Group
Tecno Glass
Thermoseal Group

GEORGIAN BARS

Ashton Industrial Sales
Hegla
Tecno Glass
Thermoseal Group

BUTYL

Ashton Industrial Sales
Fenzi
Thermoseal Group

POLYSULPHIDE SEALANTS

Fenzi

HOT MELT

Ashton Industrial Sales
Fenzi
Thermoseal Group

OTHER SEALANTS

Fenzi

PANTOGRAPHS

Fratelli Pezza

ACCESSORIES

Ashton Industrial Sales
Deltamax Automazione
Diamant - AR Nunziata
Forel
Helios Quartz
Schiavo
Sparklike
S.T. Group
Tenon (Beijing) Equipment
Triulzi

Tempering

TEMPERING FURNACES (ARCHITECTURAL GLASS)

CNUD-EFCO
Glass Company
Glasstech Inc.
Glaston Group
Hornos Industriales Pujol
Keraglass
Landglass Technology
Lema
Lisec Group
Mappi International
Schiavo
Shanghai North Glass Technology
Tekno Kilns
Texpack

TEMPERING FURNACES (AUTOMOTIVE GLASS)

Glass Company
Glasstech Inc.
Glaston Group
Keraglass
Landglass Technology
Mappi International
Mazzaroppi Engineering
Satinal Spa
SGLASS
Shanghai North Glass Technology
Taifin
Texpack

CHEMICAL TEMPERING EQUIPMENT

Glass Company
R.C.N. Solutions

ROBOT FOR CLEANING SILICA ROLLERS

Eurotech Way

ACCESSORIES

CNUD-EFCO
Deltamax Automazione
Fenzi
Glass Company
Glaston Group
Helios Quartz
Hornos Industriales Pujol
Keraglass
Landglass Technology
Mappi International
Mazzaroppi Engineering
R.C.N. Solutions
Satinal Spa
SGLASS
Taifin
Tekno Kilns
Torgauer Maschinenbau

Bending

BENDING FURNACES (ARCHITECTURAL GLASS)

Hornos Industriales Pujol
Keraglass
Mappi International
Mazzaroppi Engineering
R.C.N. Solutions

SGLASS
Tekno Kilns
Texpack

BENDING FURNACES (AUTOMOTIVE GLASS)

CNUD-EFCO
Glass Company
Glasstech Inc.
Glaston Group
Keraglass
Mappi International
Mazzaroppi Engineering
R.C.N. Solutions
Satinal Spa
Si.Ste
Taifin
Texpack

ACCESSORIES

Ayrox
Deltamax Automazione
Glass Company
Glasstech Inc.
Glaston Group
Hornos Industriales Pujol
Keraglass
Mappi International
Satinal Spa
Softeco
Tekno Kilns

Laminated glass production

COMPLETE PLANTS

Bovone Elett.
Bottero
Forel
Glass Company
Glaston Group
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Mazzaroppi Engineering
R.C.N. Solutions
Satinal Spa
Si.Ste
Texpack
Triulzi

LAMINATED WINDSCREEN BENDING FURNACES

ECOL
Glass Company
Glasstech Inc.
Glaston Group
Keraglass
Mappi International
Taifin
Texpack

AUTOCLAVES

Glass Company
Glaston Group
Hornos Industriales Pujol
Lisec Group
Triulzi

CLIMATIC CABINS

Forel
Glaston Group
IOCCO Group
Lisec Group
Triulzi

INFRARED OVENS

ECOL
Forel
Glass Company
Glaston Group
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Satinal Spa
SGLASS
Triulzi

PRESSES/BENDING MACHINES

Forel
IOCCO Group
Lisec Group
Triulzi

RESIN LAMINATING MATERIALS AND EQUIPMENT

IOCCO Group
Satinal Spa
Torgauer Maschinenbau

EVA (ETHYLENE VINYL ACETATE)

Satinal Spa

PVB

Everlam
Kuraray - Trosifol

PVB - SHAPING AND CUTTING EQUIPMENT

Ayrox
ECOL
Forel
Glaston Group
IOCCO Group
Lisec Group
Softeco

PVB - WIRING TECHNOLOGY FOR HEATABLE LAMINATES

Ayrox
ECOL
Softeco

ACCESSORIES

Ayrox
Bottero
Deltamax Automazione
Eurotech Way
Glaston Group
Helios Quartz
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Satinal Spa
Softeco
Taifin
Triulzi

Drilling

AUTOMATIC DRILLING LINES

B Solution
Bando Kiko
Bavelloni
Forvet
Glaston Group
Guangdong Northglass & Juisun Technology Industrial
Intermac - Biesse
IOCCO Group
Schiatti Angelo
SKG - Skill Glass
Vismara

MULTI-SPINDLE DRILLING MACHINES

B Solution
Bando Kiko
Bavelloni
CMS
Forvet
Glass Company
Glaston Group
Intermac - Biesse
IOCCO Group
Schiavo
Schiatti Angelo
SKG - Skill Glass
Vismara

DRILLING MACHINES WITH OPPOSITE DRILLING HEADS

B Solution
Bando Kiko
Bavelloni
Bottero
CMS
Di Gregorio
Fenzi
Forvet
Glaston Group
Hiseng Glass Machinery
Intermac - Biesse
IOCCO Group
Schiavo
Schiatti Angelo
SKG - Skill Glass
Vismara

COLUMN DRILLING MACHINES

B Solution
Bottero
Di Gregorio
Fenzi
Schiavo
Si.Ste
Vismara

PORTABLE DRILLING MACHINES

CMS
Fenzi
Schiavo
Si.Ste

DRILLING AND MILLING MACHINES

Bavelloni
Bottero
CMS
Forvet
IOCCO Group
Schiavo
SGLASS
Vismara

DIAMOND DRILLS

ADI
Bovone Diamond Tools
Diamant - AR Nunziata
Diamut - Biesse
Fenzi
Glaston Group
Mole Moreschi
Schiavo
Si.Ste
Vincent

ACCESSORIES

CMS
Fenzi
Schiavo
Si.Ste

Other equipment and plants

TURNKEY PLANTS / ENGINEERING - FOR BUILDING GLASS

Bando Kiko
Bottero
Cugher Glass
Glaston Group
Horn
Intermac - Biesse
IOCCO Group
Keraglass
Lisec Group
Torgauer Maschinenbau

TURNKEY PLANTS / ENGINEERING - FOR AUTOMOTIVE GLASS

Bando Kiko
Bottero
Cugher Glass
Easy Automation
Horn
Glaston Group
Intermac - Biesse
IOCCO Group

KEY PLANTS / ENGINEERING - FOR DISPLAY GLASS

Bando Kiko
Cugher Glass
Torgauer Maschinenbau

EDGES ROLLER COATING MACHINE

Eurotech Way

WORK CENTRES - CNC CONTROLLED

Bando Kiko
Bavelloni
Bottero
Glass Company
Glasstech Inc.
Glaston Group
Hegla
Intermac - Biesse
SKG - Skill Glass

FLOAT PLANTS/LINES (EQUIPMENT & ACCESSORIES)

Bovone Elett.
Horn
IOCCO Group

CULLET HANDLING SYSTEMS

ECOL

COMPLETE BATCH PLANTS

Zippe

VACUUM COATING EQUIPMENT AND PLANTS

Glass Company
Shanghai North Glass Technology

ENAMELLING EQUIPMENT AND PLANTS

Giardina Finishing + HS Glassprinting
Glass Company
Rollmac division of GeMaTa

HOT- AND COLD-END COATING SYSTEMS AND MATERIALS (CVD, ROLLER, CURTAIN COATERS, DRYERS)

Giardina Finishing + HS Glassprinting
Goldglass Technologies

SANDBLASTING SYSTEMS, EQUIPMENT AND PLANTS - OPTIMIZERS

Di Gregorio
Fenzi
Fratelli Pezza
Glass Company
Schiavo
SKG - Skill Glass

DIGITAL INKJET PRINTERS

Glass Company
System Ceramics

SCREEN PRINTING EQUIPMENT AND PLANTS

Ayrox
COMSS
Cugher Glass
Deltamax Automazione
ECOL
Eurotech Way
Giardina Finishing + HS Glassprinting
Glass Company
Guangdong Northglass & Juisun Technology Industrial
Keraglass
Rollmac division of GeMaTa
Shanghai North Glass Technology
Softeco

SCREEN PRINTING FRAMES

COMSS

SCREEN PRINTING DRYING SYSTEMS

COMSS
Cugher Glass
Glass Company
Guangdong Northglass & Juisun Technology Industrial
Rollmac division of GeMaTa

ACIDING GLASS EQUIPMENT AND PLANTS

Lisec Group
Rollmac division of GeMaTa

LASER DECORATING MACHINES

Ashton Industrial Sales
Glass Company

LASER MARKING

Ashton Industrial Sales

Artistic glass production

CERMAMIC INKS

Glass Company

CHAMBER ELECTRIC KILNS

Glass Company
Keraglass
Tekno Kilns

ACCESSORIES

Deltamax Automazione
Helios Quartz

CUTTERS

Si.Ste

CUTTING WHEELS

Si.Ste

MANUAL GRINDING MACHINES

Di Gregorio

UV ADHESIVES

Si.Ste

Miscellaneous

ADHESIVES FOR GLASS BONDING

Si.Ste

AUTOMATION

Ashton Industrial Sales
Goldglass Technologies
Horn
IOCCO Group
Torgauer Maschinenbau
Zippe

AUTOMOTIVE GLASS APPROVAL SERVICES

Ayrox
Softeco

AUTOMOTIVE GLASS QUALITY CONTROL

Ayrox
Bando Kiko
Cugher Glass
Deltamax Automazione
Easy Automation
Glaston Group
IOCCO Group
Softeco

CE MARKING - QUALITY CONTROL EQUIPMENT FOR GLASS IN BUILDING

Ayrox
Softeco

COATING OF GLASS SHEETS - SYSTEMS & MATERIALS - HOT / COLD END

Goldglass Technologies

COLOURS & ENAMELS - OTHER APPLICATIONS

Ayrox
Goldglass Technologies

DEIONIZING AND WATER SOFTENING EQUIPMENT

Fenzi
Forel
Glass Company
Idrotecnica
Lisec Group
Triulzi

FLAT GLASS QUALITY CONTROL DEVICES

Ayrox
Deltamax Automazione
Forel
IOCCO Group
Softeco

FURNACES

Glass Company
Horn
Texpack

FURNACES / HYDROGEN GENERATORS (WATER ELECTROLYSERS)

Nel Hydrogen

GLASS COATING AND TINTING

Giardina Finishing + HS Glassprinting
Glass Company
Goldglass Technologies
Rollmac division of GeMaTa

GLASS TREATMENT FILMS

Glass Company

HEATING EQUIPMENT - STANDARD (GAS FIRING, BURNERS, AIR GAS MIXERS, SAFETY DEVICES, ELECTRICAL RESISTORS)

Horn
Keraglass
Texpack

SUPPLIERS GUIDE Yellow Pages

HINGES FOR GLASS DOORS
Si.Ste

METAL ACCESSORIES
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Optris

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Cugher Glass
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