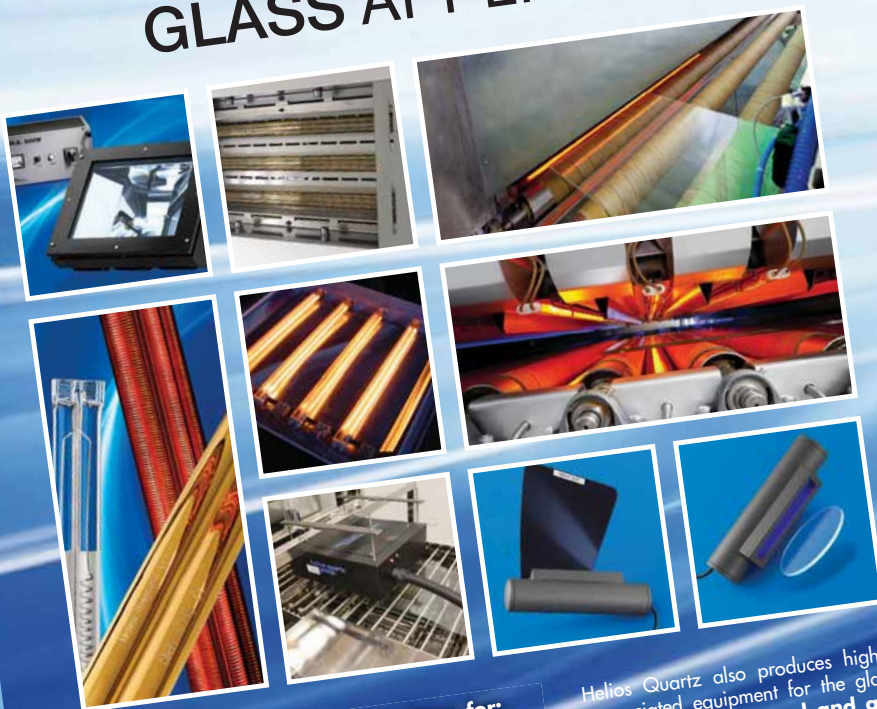


# Glass-Technology International

THE LEADING MAGAZINE FOR THE INTERNATIONAL FLAT GLASS INDUSTRY

November/December • Year 30 • No. 6/2019

## GLASS APPLICATIONS



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- dry screen printing lines

IR medium wave single tube emitters for:

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- fusion furnace

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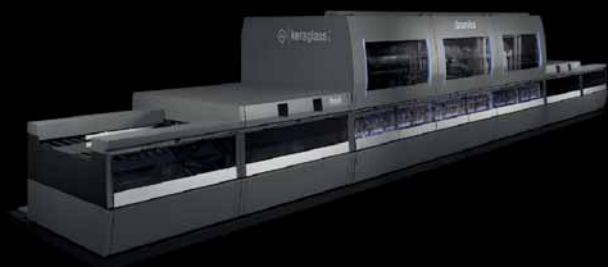


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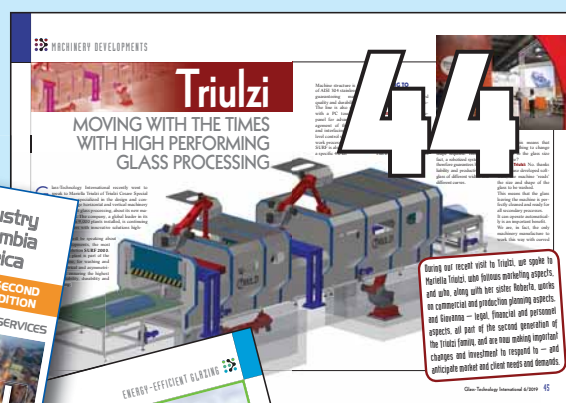
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**GLASS PRINTING**

## Cugher Glass

With the glass printing process, Cugher Glass is developing its most recent products, even more innovative.

**RESPONDING TO - AND ANTICIPATING - THE NEEDS AND DEMANDS FOR FLAT GLASS SOLUTIONS**

Glass Technology International #2019

**DIGITAL PRINTING**

## Rollmac-Gemata

TAKING GLASS PRINTING TO THE NEXT LEVEL

During the recent edition of Vitrum, Glass Technology International spoke to Rollmac-Gemata about its most recent development in the glass printing sector. With glass sizes becoming bigger and bigger, and requests for digital printing more and more complex, the company has come up with a machine able to satisfy all these needs.

**TECHNICAL SPECIFICATIONS**

Rollmac-Gemata has developed a new digital printing machine, the Rollmac-Gemata 1000, which is able to print on glass panels up to 1000x1000 mm. The machine is equipped with a digital printing head, which can print on glass panels of different thicknesses and colors. The machine is also equipped with a digital printing head, which can print on glass panels of different thicknesses and colors.

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**COMPANY UPDATE**

## Tuomas

POSITIVE RESULTS AT VITRUM 2019

Tuomas, the international fair specialized in machinery, equipment and plants for the glass industry, was held from 14 to 16 October in Milan, northern Italy. Tuomas was, once again, proud of the event with its complete range of standardized machinery for manufacturing - and laminated glass, as well as intelligent change and - of course - industry 4.0 solutions.

**TECHNICAL SPECIFICATIONS**

Tuomas has developed a new digital printing machine, the Tuomas 1000, which is able to print on glass panels up to 1000x1000 mm. The machine is equipped with a digital printing head, which can print on glass panels of different thicknesses and colors. The machine is also equipped with a digital printing head, which can print on glass panels of different thicknesses and colors.

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  - insulating lines
  - dry screen printing lines
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  - bending furnaces
  - heating furnaces
- IR fast medium wave twin tube emitters for:
  - laminated glass cutting machines

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|   | <b>EURASIA GLASS</b>   | 4-7 March       | <b>ISTANBUL</b><br>Turkey      |   |
|   | <b>ICCG</b>  | 23-26 March     | <b>BRAUNSCHWEIG</b><br>Germany |   |
|   | <b>FENSTERBAU FRONTALE</b>   | 28-21 March     | <b>NUREMBERG</b><br>Germany    |   |
| 2020  |   |                 |                                | Editorial files:<br><b>17-02-2020</b><br>Deadline Adv files:<br><b>28-02-2020</b> |
| 2020<br>2   | <b>CHINA GLASS</b>   | 14-17 April     | <b>SHANGHAI</b><br>China       | Editorial files:<br><b>03-03-2020</b><br>Deadline Adv files:<br><b>17-03-2020</b> |
| 2020<br>3   | <b>GLASS SOUTH AMERICA</b>   | 3-6 June        | <b>SÃO PAULO</b><br>Brazil     | Editorial files:<br><b>17-04-2020</b><br>Deadline Adv files:<br><b>30-04-2020</b> |
|   | <b>MIR STEKLA</b>  | 8-11 June       | <b>MOSCOW</b><br>Russia        |   |
| 2020<br>4   | <b>GLASSTECH MEXICO</b>  | 27-29 July      | <b>GUADALAJARA</b><br>Mexico   | Editorial files:<br><b>12-06-2020</b><br>Deadline Adv files:<br><b>27-06-2020</b> |
|   | <b>GLASSBUILD AMERICA</b>  | 15-17 September | <b>LAS VEGAS (NV) USA</b>      |   |
| 2020<br>5   | <b>GLASSTEC</b>  | 20-23 October   | <b>DUSSELDORF</b><br>Germany   | Editorial files:<br><b>04-09-2020</b><br>Deadline Adv files:<br><b>18-09-2020</b> |
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IOCCO

## The biggest De-Airing Vacuum Bag Furnace ever built is also technologically advanced



IOCCO has recently designed, built and installed the biggest Vacuum Bag Furnace in the world, also able to process large-sized coated ultra-thin OEM automotive glass such as Sunroofs.

IOCCO's R&D team has made a number of important technological changes regarding the process cycle, the vacuum control system during De-Airing of the glass, and, above all, with regards to energy savings.

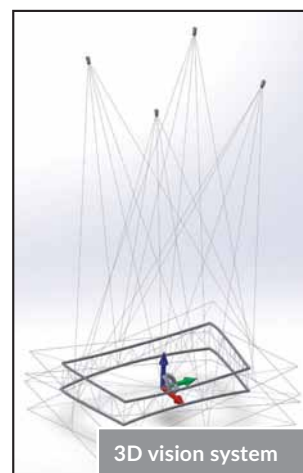
These investments carried out by IOCCO to reach goals in terms of energy efficiency, optimization and control of the technological processes, are motivated by the the new expectations of government bodies and auto manufacturers; the latter requesting ever more coated, ultra-thin glass in larger sizes, mass produced by plants with ultra-high control and automation systems in line with the Smart Factory philosophy.

IOCCO has therefore responded to the challenge of one of its 'historic' clients, to develop part of a new fully automated plant capable of producing very high-tech auto glass in a completely automatic way without any human intervention, from the loading of the raw glass to the finished glass ready to be installed in the car.

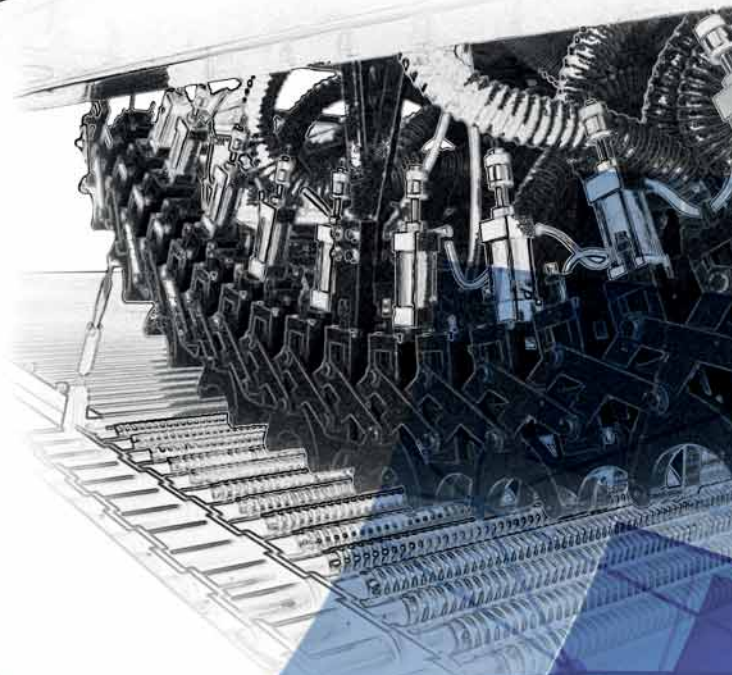
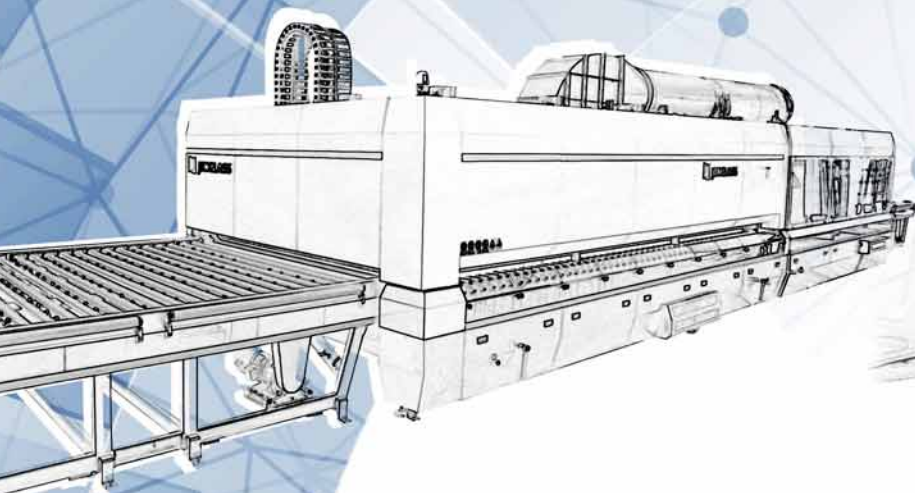


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"Throughout his career, Brian has cultivated relationships with architects, designers and engineers in the construction industry," said Dan Adams, director, architectural development, Vitro Architectural Glass. "His experience working with the architectural community puts him in a position to effectively address and respond to the informational needs of the customers in his region."

Lurie joins Vitro Glass with more than 15 years of experience in specification sales with three Fortune 1000 companies. He began his career as a national account representative for Black and Decker and most recently served as regional sales manager for Insight Lighting in Rio Rancho, New Mexico. Lurie holds a Bachelor of Arts degree in History from California State University, Chico. He will be based in the San Francisco area. [WWW.VITROGLAZINGS.COM](http://WWW.VITROGLAZINGS.COM)



TVITEC

## "The beauty of curves", a new concept in architectural glass

**T**vitec has started to implement new concepts on its fabrication of curved glass for the architectural glass market worldwide. The Spanish company is running one of the largest plants in Europe for the processing of this product. More than 25,000 square meters equipped with state-of-the-art technology, never seen before on such a specialized sector. The new premises are located near Ponferrada, at the industrial zone of Cabañas Raras (León-Spain), right next to Tvitec's main plant with more than 100,000 square meters of fabrication surface.

The machinery that Tvitec has developed to process curved glass is able to provide two main solutions: annealed curved glass and heat treated curved glass. On annealed curved glass Tvitec is capable to fabricate large sizes with assorted geometries either in insulating glass, safety and acoustic laminates and printed glass. The result, based on some emblematic jobs already delivered, is a really high optic quality.

On heat treated curved glass Tvitec is offering cylindrical lites with an excellent finish.

- By using the Length Bending technology and depending on the glass size and overall thickness, a minimum radius of 500mm can be achieved.

- The Cross Bending technology allows Tvitec to fabricate sizes up to 6 meters with radius from 2000mm on.

Curved glass products by Tvitec are handled on fully and highly automatized lines in comparison with the rest of the industry. This fact allows the possibility of offering solutions with shorter lead times and more competitive prices.

Tvitec counts on a highly specialized technical team providing architects, consultants, contractors and facade builders with customized advice so that their projects can achieve from the very beginning a perfect balance between aesthetics, luminosity and sustainability on glass either for residential applications, office buildings, infrastructures or interior spaces.

On any project with curved or flat glass that can appear to be complex, Tvitec and its team of experts will be able to propose a unique, satisfactory and simpler solution, and from now on, giving a whole and combined recommendation for both curved and flat glass.


[WWW.TVITEC.COM](http://WWW.TVITEC.COM)

"Curves are beautiful",  
"The beauty of curves"

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**Hall: 5&6 Booth: F11**

ZAK GLASS TECHNOLOGY EXPO 2019

Pragati Maidan, New Delhi, India | 12-15 December 2019

**Hall: A5 Booth: GD18**



Huawei Global Flagship Store

## THE 3<sup>RD</sup> GENERATION ADVANCED SERIES (A-SERIES) GLASS TEMPERING FURNACE



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LiSEC

## Ad hoc training

**T**GD Thermo Glass Door, a young company, founded in 1999, which today boasts 80 permanent employees and, since 2014, part of the LU-VE Group, has always produced insulating doors for refrigerators for displaying preserved products, used both by large-scale retailers and for ice cream parlours, pastry shops, wine bars and food vending machines. They are also used for the preservation of medical products and all products that need exposure, even subzero, aesthetically refined but of extreme quality for the preservation of products.

"TGD has its own glass department that takes up over a third of the entire company," explained Daniele Carena, the company's Glass Department Manager for about two years. "The glass industry is constantly evolving: we temper and assemble insulating glass; moreover, we have recently been specializing in digital printing to perfect the aesthetics and beauty of our doors with screen printing."

The other division of the company is responsible for creating finished products: the doors, complete with handles, hinges and frames. "Our biggest investment, which can be said goes hand in hand with the continuous research of our technical department, always working on the improvement of quality and aesthetics, is aimed at the growth and specialization of each of our individual operators," continued Daniele Carena. "That's why we purchased the latest LiSEC machine, an automatic sealing robot of the latest generation, second to none in the world. We sent our operators to Austria, where the parent company is based, for specialized training. The aim is to ensure that every single person who uses our machines truly knows the tool with which he works in order to obtain the best results and know-how to face difficulties, also regarding maintenance, that can occur to any new and new and so complex machine."

LiSEC offers this exclusive personalized training to customers who purchase its technologically advanced machinery for flat glass processing.

"The great added value of this training at the headquarters of LiSEC in Austria was tangible, not only from a technical point



of view but also from a human point of view," said Carena. "Our wealth is our brain, the ideas that, as we all know, are activated best when the work environment is peaceful and welcoming.

"Going to LiSEC meant being welcomed as if we had always known each other, to breathe an air of total harmony, cooperation and exchange. Our operators, for example, experiences an operational difficulty with one of the gaskets of the new machine during early days, and, when they arrived in Austria, the LiSEC engineers had already found the solution to the problem."

The willingness to listen and the commitment to find together

the best way to make the new machines run at their maximum potential are priceless, because even the operator feels he has made his own contribution to improving research. This collaboration between operators who use the machines



every day and technicians who create them is the union of intent that leads to perfection in the technological development of new systems, not only in the glass business but in every sector.

The market for glass doors for refrigerators is constantly growing and has very special requirements.

The objective of TGD is to create doors that provide excellent visibility of the products inside. The difficulty is given by the thermal exchange to which they are continuously subjected. The stresses caused by significant temperature changes are "in the order of the hour": if you think of ice cream and soft drink refrigerators in the middle of summer you can easily count numerous openings per minute. For this reason, TGD technical office has filed several patents.

Carena also underlines the importance of operating refrigerators with closed doors – even in supermarkets, for environmental sensitivity and sustainability.

This, in addition to reducing energy costs due to the lower dispersion of the cold, makes the environment in which the customer has to shop more comfortable, avoiding exposure to low temperatures and allowing the products to be stored at the optimum temperature. For a company like TGD, creating doors in favour of thermal insulation requires constant research and quality checks on several fronts: glass is the first to be tested and "stressed" by important temperature changes but also hinges, handles and the profiles must pass the established quality checks and standards before obtaining the TGD mark.

In a future vision, the technical office aims to achieve a very high aesthetic level: the transparent edge of insulating glass and digital printing are just the latest innovations created to meet the new needs of the market.

Last but not least, the Glass Department Manager stated, "There are three qualities that characterize Thermo Glass Door thanks to the values that the Lu-Ve Group transmits to us: dynamism, loyalty and 'familiarity' in the most positive meaning of the term, because there is constant attention from top management to make us all feel important and an integral part of the same family."

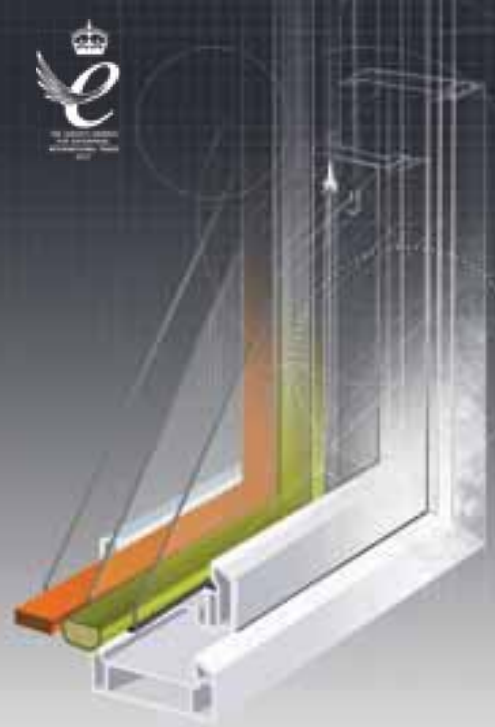
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# From inception, to perfection

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AGC Glass Europe - Moustier Plant: optical quality control of the continuous glass ribbon. Photographer: Jean-Michel Byl - © AGC Glass Europe



AGC

## Refurbishment of float glass furnace in Moustier

**A**GC's Moustier line produces float glass that is destined mainly for transformation into laminated, coated, silvered, varnished and acid-etched AGC glass products, also serving the AGC processing and distribution network.

The float line will be refurbished with the most advanced AGC technologies, significantly improving its performance to meet the highest standards in terms of safety, quality and environment. The design improvements will significantly reduce its energy consumption by 20%, with a corresponding positive impact on atmospheric emissions: 25% less CO<sub>2</sub> (carbon dioxide) and 40% less NO<sub>x</sub> (nitrogen oxides). The cold repair is also aimed at an increase of productivity and cost competitiveness of the site. The float line is expected to shut down during this last quarter of 2019 and is scheduled to restart production in the last quarter of 2020. "At that time, this refurbished facility will fully

support our policy aimed at providing high-performance products and improving customer service, while contributing to a sustainable future," said Philippe Bastien, Regional President – Building & Industrial Glass Europe.



[WWW.AGC-GLASS.EU](http://WWW.AGC-GLASS.EU)

KÖMMERLING

## Getting clever with a Genius start-up



**N**o strangers to large scale window and door fabrication, Peter Dyson and David Eagle are heading up this new business venture with the aim of reaching 2,500 frames per week in just a matter of years. **Genius** chose **KÖMMERLING** as their preferred profile partner, due to the inherent quality in the window and door systems, outstanding product engineering and from the high profile and award-winning marketing campaign that's really catapulted the German brand into the limelight.

Genius are already manufacturing the chamfered and ovolo KOMMERLING 70 systems, along with the feature packed PremiLine patio door. Peter Dyson, co-director commented, "We're thrilled to have the backing of a premium brand and are looking to build this business on exceptional product quality and service. We spent considerable time assessing the virtues of several systems companies, with KÖMMERLING proving to be the standout brand and this decision has already been vindicated with fantastic feedback from our customers."

He continued, "It was important for us to find the right partner, with a highly visible brand, something that KÖMMERLING has really built on this year and it will be fundamental for us as we look to accelerate growth." Gareth Jones, managing director of Profine UK and the KÖMMERLING brand added, "We're delighted to have brought Genius on board on the back of our strong marketing campaign and unrivalled product range. David and Peter have an exceptional track record of building large-scale window and door manufacturing facilities and we look forward to supporting them on their quest to be a major player for PVCu frames over the next few years."



[WWW.KOEMMERLING.COM](http://WWW.KOEMMERLING.COM)



DOW AND SWISSPACER

## Glazing edge at the highest level



**A**gainst the background of constantly increasing demands on the energy efficiency of glass façades, the focus is increasingly shifting towards the glazing edge of insulating glass with multiple panes and structural glazing applications in particular.

Because while the U values of the glass itself have little left to optimize in terms of efficiency, there is still significant potential in the sealants and spacer bars used. So sealant expert **Dow** and **SWISSPACER** – the specialist in warm edge spacer bars – initiated a joint study on this. The study, carried out by renowned engineering firm Bauwerk (Rosenheim), shows: an optimal combination of the sealant and spacer bar can improve the U<sub>gw</sub> value of a façade by more than 15% – without changing the façade design.

Within the framework of the study, different façade designs were studied with a conventional Polyurethane (PU) sealant, a standard silicone sealant, as well as the patented silicone technology DOWSILTM 3364 Warm Edge IG Sealant – each combined with a stainless steel spacer bar or the SWISSPACER Ultimate.

The results are clear: For example, DOWSILTM 3364 in combination with the SWISSPACER Ultimate in a piece of triple glazing (40 mm) as part of an aluminium façade design (100 mm profile depth, element size: 1×2 m) achieved a U<sub>gw</sub> value of 0.846 W/m<sup>2</sup>K – this means a more than 13% lower heat transmission coefficient in comparison with the use of a stainless steel spacer bar. With a conventional PU sealant and the stainless steel spacer bar, the same façade design achieves a U<sub>gw</sub> value of only 1.002 W/m<sup>2</sup>K – the overall energetic performance of the high-end solution is therefore about 15% better.

In comparison with the conventional sealant and a stainless steel spacer bar, the high-end solution also results in a temperature on the inside of the glass that is 2° higher. In a normal climate (room temperature 20°C and relative humidity 50%), condensation forms with this set-up only from an outside temperature of -49°C.

An advantage for metal manufacturers and smaller façade construction companies: all-glass façades with U-profiles ("toggle systems") are suitable for small and medium-sized façades, as they are simple and cost-effective. With the performance of DOWSILTM 3364 and SWISSPACER Ultimate, they also boast excellent energy efficiency. Building owners, architects and designers will also be pleased to know that costly design changes or external wall insulation will in many cases not be required.


[WWW.DOW.COM/CONSTRUCTION](http://WWW.DOW.COM/CONSTRUCTION)

[WWW.SWISSPACER.COM](http://WWW.SWISSPACER.COM)

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MAPPI

## Chosen by CAG, leader of glass façades in South East Asia

**S**kyscrapers and their glass façades represent a characteristic element of every metropolis, a universal sign of modernity and constructive excellence. They also represent the most difficult challenge for those who work with glass as they require the ability to produce and assemble large flat glass panes without the slightest defect.

**CAG**, a company based in Vietnam has, in 15 years, become leader in the design and manufacture of glass façades, not only in Vietnam but in much of South East Asia. Such a success is the result of the desire to continuously improve, both in the skills of the people and in the systems. And that's why today CAG has equipped itself with a very modern **Mappi** ATS 4.0 tempering furnace.

"The furnace we chose convinced us with its flexibility, ease of use, excellent tempering glass, and extremely low energy

consumption. All this thanks to the use of extremely refined technologies," said Dao Cong Duy – CAG's General Director. "CAG is a company that never tires of growing and improving, Mappi has been close to us, as a partner rather than as a supplier, they perfectly understood our needs and gave us the tool we were waiting for: an ATS 4.0 tempering furnace 2500×4200."

The strength of Mappi tempering furnaces has always been the use of exclusive solutions for temperature management, slab handling and optimization of glass handling, all operations capable of making the difference, every day.

The ability to collect and prepare for processing a large amount of data that allow the entrepreneur to make increasingly accurate and efficient choices is a further reason the prefer Mappi. "We chose Mappi because we want to offer our customers products and services that make the difference. When we make the commitment to build a Ministry, an Airport or a Business Center, we put our reputation at stake. Mappi enables us to strengthen our reputation and that of our customers."



WWW.MAPPI.IT

GUARDIAN GLASS

## Millbury plant to be shut down

**G**uardian Glass has announced that it will be closing its Millbury plant, which will result in job losses for 77 hourly and 23 salaried employees who work at the plant.

In its filing with the Ohio Department of Job and Family Services, Guardian Glass, based in Auburn Hills, Mich., gave no explanation for the closing but called it a "business decision". The plant makes consolidated glass, mirrored glass, and vacuum insulated glass.

Guardian said it expects to begin eliminating jobs starting on 20 November, and will continue to lay off workers in phases through the closure. Employees are not represented by a union. The company said it will work closely with affected employees to minimize the impact of its decision. The Millbury glass fabricating plant was constructed in 1959 at a cost of USD 250,000 and opened in the spring of 1960.



Guardian Glass in Millbury, OH, USA

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## NORTHGLASS

## Huawei flagship store becomes a “shining diamond”



**S**henzhen MixC Shopping Mall, known as the most “luxury” shopping mall in Shenzhen, is built with four featured formats of international fashion, special catering, children’s world and cultural life to build a way of life for all customers. The MixC Shopping Mall including nearly 300 stores, more than 1,000 brands, 12 single brand flagship stores, including many domestic and foreign giant brand flagship stores.

In September 2019 Huawei’s global flagship store of mobile intelligent terminals was grandly opened, creating a shining “diamond” for the most “luxury” MixC Shopping Mall.

At a glance, Huawei’s global flagship store looks like a quad-rate triangular glass building, each corner of which is in an arc. The unique semi-open staircase presents a borderless com-

munity atmosphere, allowing people to enter the store more freely to rest or communicate. The whole building presents a sense of open and bright space, which stands out from the numerous flagship stores.

The Huawei Cloud Park Store was the first time **NorthGlass Tianjin Company** cooperated with Huawei. NorthGlass provided high-quality glass for this project.

NorthGlass Tianjin Company, a world-renowned enterprise providing curtain wall glass for many classical buildings in the world, has taken over all the facades and panels glass of Huawei’s global flagship stores. It covers 174 pieces of glass, including plane, single-curved, L-shaped single-curved, multi-curved, complex-curved, small radius and large size. There are 37 pieces of complex-curved glass, 27 pieces of L-curved and 10 pieces of double-curved corner glass, 10 metres of super thick facade glass and 8 metres of super wide glass guardrail. The finishing touch of the whole project is the graceful arc curve of the curved globular glass. NorthGlass’ designers got the curve similar to the shape of “inverted wine glass”. The glass is composed of 450 millimetre small radius arc and asymmetric arc, three pieces of super white glass utilizing hot bending, chemical tempering, three-time calcination and colour matching of coloured glaze, SGP laminated and embedded metal parts. The three-side glass to glass splicing, leaving one side bottom edge exposed, made the production very difficult. According to architects of Saguez & Partners in France, they searched around the world for deep-processing glass manu-



The crystal clear glass of NorthGlass perfectly interprets the design concept of the flagship store



The designer of the flagship store was explaining the inspiration of the hemline glass at the opening event The most difficult multi - curved hemline glass



Hemline glass in NorthGlass Tianjin Company factory is ready to go



[WWW.NORTHGLASS.GLOBAL](http://WWW.NORTHGLASS.GLOBAL)

facturers and found only two that could meet the designer's requirements. NorthGlass is the only one in China.

Taking the opportunity of the opening of the global flagship store, President of NorthGlass, Gao Li, vice President of NorthGlass and general manager of Tianjin Company, Gao Qi, were invited to the Huawei global flagship store to talk with the person in charge of the flagship store and senior leaders, and to discuss some technical difficulties. Both sides realized that NorthGlass and Huawei share the same corporate culture of pursuing innovation and quality. Therefore, both expressed the intention of further strengthening cooperation in architectural glass.

Huawei's super global flagship store is not only the display and retail of products, but also will become a public science and technology space with advanced ideas and advanced

technologies, a full experience integrating science and technology, culture and services, attracting tourists from all over the world.

# FILTRAGLASS

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**NSG**

## PAIRMULTIEA® and SE® selected as No. 1 co Premium Products

**A**n award ceremony for eco-friendly products was held on 9 October 2019 at the ECO-TECHNOLOGY Exhibition 2019, the largest exhibition of cutting-edge environmental and energy technology.

Through its innovative glass technology, **NSG Group** will continue to save energy in the buildings and houses.

PAIRMULTIEA® and SE® low-E IGUs are manufactured by NISHINIHON ITAGARASU CENTERCO., LTD., by utilizing the Group's proprietary online CVD coating technology. The products are equipped with excellent thermal insulation and

heat shielding properties contributing to saving electricity by alleviating burden on the air conditioning in buildings and houses.

One of the low-E (emissive) coating methods utilizing CVD (Chemical Vapor Deposition) technology. Low-E coating with excellent durability can be performed in the process of producing float glass by leveraging its high temperature.

The Kitakyushu Eco Premium Program is run by Kitakyushu municipal government. Designed to choose environment conscious products and services manufactured or provided within the city that will contribute to reduction of environmental burdens as "Kitakyushu Eco Premium" for large-scale promotion to enhance their awareness and help increase their sales.



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**AGC**

## Two new solar coatings

**A**GC solar control glazing products are high-tech glass products capable of meeting today's growing energy and aesthetic requirements. Stopray products feature a superb coating that ensures optimal solar control in the summer while their exceptionally low Ug value prevents heat loss in the winter.

Stopray Ultra-70 on Clearvision new, high-performance soft-coated glass products features a triple silver coating that maximises light transmission while significantly reducing solar heat gain. Sought after by architects for its low interior and exterior light reflection, this new coating is also a natural choice for glass processors because of its flexible processing options.

Stopray Ultra-70 on Clearvision delivers a light transmission rating of 70%, a solar factor of 33 and a selectivity of 2.10, with low internal and external light reflection, and is mainly used in office building facades.

Stopray Titanium 34T is a unique heat-treatable magnetron-coated glass product. There is nothing else like it on the market. Its high solar protection rating and superb light and energy performance make it the perfect choice for hot climates. Featuring body-tinted grey glass, this product is highly prized for its low interior and exterior light reflection and delightful aesthetics, giving processors and architects plenty of leeway to play with the look of a building.




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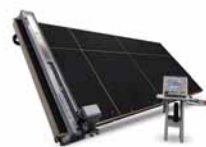
CNC machining centres



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Cutting tables



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CMS Glass Technology commitment generates machining centres for top quality results in glass creations. Outstanding systems, designed to bring added value in multifarious industrial fields. CMS is an industrial partner rich in solutions aimed at engineering and process optimization.





BYSTRONIC GLASS - GLASTON

## New apps connect machines from Bystronic glass

The question of connecting the business world using the keyword "Industry 4.0" is currently widely discussed. Today using intelligent algorithms, machines and plants must be designed in such a way that they optimize their processes themselves. This means that consumables and related costs can be effectively reduced. Above all, of course, is user-friendly usability which should be as intuitive as possible.

As one of the leading companies worldwide, **Bystronic glass** manufactures machines for the pre-processing of automotive and display glass (cutting, breaking, grinding, drilling). Technical innovations such as the B'CHAMP or the B'BRIGHT help automotive and display glass manufacturers to operate more efficiently and cost-effectively. With the new automotive glass apps, Bystronic glass supports its customers on their way to digitization.

### ALL APPS ARE ALREADY ON BOARD BY DEFAULT

All apps are included in the delivered control systems by default. The software licenses can be activated individually on request. This means there is no need to purchase additional hardware and software!

The interface is based on the Advanced Control System (ACS) 3 and is easy to operate without keyboard or mouse by the user. Multi-touch gestures are also supported. All apps are



pre-installed in the ACS3 panel in 11 different languages. So, nothing prevents the worldwide use.

### VARIOUS POSSIBILITIES FOR USERS WITH APPS

Each user of a B'CHAMP or B'BRIGHT has access to two free-ware apps for analysing production data. In addition, each production cell can be extended with individual user rights or its own parameter memory for each job.

The Bystronic glass developers are particularly proud of the Automatic Grind-In App enabling fully automatic adjustment of the grinding machine after a job change. This results in maximum flexibility for the customer. In a further benefit, the Tool Break-In App enables operators to produce the first glass lite without quality loss after a tool change. This significantly reduces material rejection.

With the automotive glass apps, it is possible to monitor up to six production cells by remote control. This shortens long distances in production dramatically. At the same time, customers can connect their B'CHAMP and B'BRIGHT via the OPC-UA interface. Big data analysis or IoT applications are possible without any problems thanks to Bystronic glass 4.0. In that way Bystronic glass makes the future within reach for the customer.



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Angelo Rivera (right) passes the gavel to incoming chair, Chris Bole

NGA

## Board leadership announced for 2019-2020

At its meeting at GlassBuild America in Atlanta, the NGA board of directors welcomed Chris Bole, *Pikes Peak Glass Inc.*, Colorado Springs, Colorado, as chair for the upcoming term.

Cathie Saroka, *Goldray Glass*, Calgary, Alberta, Canada, was voted in as chair-elect. Doug Schilling, *Schilling Inc.*, Galion, Ohio continues as treasurer; Angelo Rivera, *Faour Glass Technologies*, Tampa, Florida, will serve as immediate past chair.



WWW.GLASS.ORG

HHH TEMPERING & NORTHGLASS

## Fuyao contract

**H**HH Tempering Resources (HHH), a wholly subsidiary of Salem Distributing, and NorthGlass earn Fuyao Glass America® (Fuyao) contract for additional continuous furnaces.

Following installation at Fuyao's U.S. facility, the AX1 model continuous tempering furnaces will produce ultra-thin solar glass. HHH is providing furnace consultation, installation and U.S.-based technical support for the new Fuyao furnaces.

"HHH is looking forward to working alongside the Fuyao Glass America team to provide fast installation and local tech-



nical assistance so that the equipment can be up and running by spring 2020," said HHH President/CEO Mike Synon.

Fuyao Glass America is a large automotive glass manufacturer, headquartered in China. Major customers include General Motors®, Ford®, Chrysler® and more.

ŞİŞECAM

## Bulgarian plants to boost output

**T**o support Şişecam Automotive Bulgaria's and Paşabahçe Bulgaria's plants the Electricity System Operator is currently investing BGN 3 million in the expansion of the power substation near the two companies' plants in Targovishte, announced the energy ministry.

The power substation expansion is expected to be completed in March 2020.

In addition, gas transmission network operator Bulgartransgaz is building a 17.6-kilometre gas pipeline to the production facilities, in order to ensure extra quantities of natural gas. The project is expected to be wrapped up in July 2020.

The road infrastructure near the production facilities will also be improved.



WWW.SISECAM.COM.TR





# Intermac &



## AUTOMATION, SPEED, PRECISION - WITH THE HIGHEST QUALITY IN MIND

**D**uring our press tour at the Intermac stand during Vitrum, our first stop was with Raphael Prati and Franco Angelotti, who

spoke to us about commercial aspects of the company, ever more moving towards internationalization, working at global level, and – at the same time – responding

to local needs. And it is clear that this company policy is paying off as we were informed that Intermac has doubled its turnover compared to the

2013-2018 period. This means that the company's work for the present and the near future is therefore that of maintaining and strengthening Intermac's



# Diamut at Vitrum 2019

During the 2019 edition of Vitrum, Glass-Technology International was invited to take a tour of the company's stand — this year with the name 'Automaction' - guided by a few of the key people of the company. Focusing more and more on Industry 4.0, Intermac is working to further strengthen the relationship between humans and robots, and members of the press had the chance see for themselves the most recent developments with innovative, revolutionary technology, able to bring more personalisation, modularity and flexibility to tomorrow's workplaces.

international market position with — as always — top level, high quality products and systems.

Investments in technology are always an important part of machinery manufacturers and with numerous developments in robotics, software and services, Intermac is continuing its work in this sector, also thanks to its more than 200 active patents. Another important part of Intermac's investments regards the Academy, where techni-

cians work together on new projects and learn about the possibilities these developments can have.

## **PRODUCT DEVELOPMENTS ON SHOW**

### **Master 33.3 with ROS**

With Matteo Traini, we got a first-hand idea of how benefits can be obtained from the integration of technology with ROS (Robotically Operated Systems). The ROS guarantees limitless and effective





production and consists of an anthropomorphic robot at the service of the Master 33.3 3-axis machining centre. Dedicated to processing glass, this machine is capable of performing the full range of machining operations without compromising on performance, ideal for those who need automated solutions for the production of large batches.

#### **Genius Comby Plus R-A37 with Swift Shuttle**

The Comby Plus R-A37 version of the Genius CT-Plus is for those who wish to achieve ultimate productivity with a minimal

footprint and in less time, while maintaining elevated cutting precision. The cutting line integrates with the Movetro handling and storage systems: thanks to the Swift shuttle with 4 regular positions, it can store and handle sheets of glass in a very small space. The Movetro line is, in fact, a cutting-edge adaptation of the classic model: a solution that can be personalised and configured, capable of feeding multiple cutting lines at the same time after collecting the sheets from fixed racks or from automatic classifiers – with the option of returning the

unused section of the sheet to its original position or to specific stations.

The Genius LMA machine on show is able to process both laminated and monolithic glass, and is the result of a clever combination between the Genius CT-A and CT-Red cutting tables: two automatic lines, one for float glass and one for laminate, even in smaller spaces.

High-speed tooling, zero set-up time, max flexibility. Another important development on show at Vitrum regarded the revolutionary, innovative technology for the high-speed tooling of corner-rounding units with

the Busetti F-Series double-edging grinding range of products. The Radius Revolution's high-speed tool change system, taking about 2 minutes, offers the opportunity to redesign the production process, opening new application horizons for traditional double-edging lines.

The radiusing units are Intermac patented devices for the creation of rounded or chamfered corners, both matt diamond-edge and polished, from 1 to 5mm (for radii) and 1 to 7mm (chamfers). With this innovative system, the glass no longer needs to be stopped



inside the machine; the rounding or chamfering operation can be performed while the glass is being machined, with no need for additional equipment.

#### **The Digital Hub – IC and Sophia**

The Digital Hub took centre stage at Intermac's stand, serving as the link between the software packages, where visitors had the chance to ex-

perience all the functions of the software installed on Intermac machines, including SOPHIA, the IoT service platform that provides real time information and data through intuitive dashboards with the aim of improving personalised interaction with the customer on the basis of the machine and reducing assistance times even further. Vitrum was also the debut of IC – THE EVO-





LUTION OF ICAM, with a new easy to learn and use interface, based on a robust and reliable platform that offers optimised calculation power thanks to the use of the latest technology for development.

#### Diamut – tooling division

During our press tour, we also met with Alberto Bizio of Diamut to find out about the machining results

obtained with tools guided by the refined technology of the machines of Biesse Group's glass division.

The close collaboration between Intermac and Diamut guaranteed that each machine bought is supplied with the right tools for the work it has to carry out and this is also guaranteed with the Start Up Tool Kit. The case includes an optional supply of Diamut tools and accesso-



#### DIAMUT

Diamut is the tooling division of the Biesse Group. It has over thirty years of experience in the production and sale of a complete range of utensils – for the machining of glass, stone and ceramic materials – that can be used on most numerical control, automatic and semi-automatic machines. Thanks to the superior quality of the tools it manufactures, Diamut is the trusted partner of a range of

successful companies that operate in numerous industries: from aeronautics to domestic appliances and from electronics to furniture and architecture.




#### BIESSE

Biesse Group is a global leader in technology for processing wood, glass, stone, plastic, and metal. It designs, manufactures and distributes machines, integrated systems and software for manufacturers of furniture, door/window frames and components for the construction, ship-building and aerospace industries. It invests an average of EUR 14 million per year in R&D, boasting over 200 registered patents. The company operates through 12 industrial sites, 39 branches, and 300 agents and selected dealers, exporting 90 per cent of its production. Its customers include some of the most prestigious names in Italian and international design. Founded in Pesaro in 1969 by Giancarlo Selci, Biesse SpA has been listed in the STAR segment of the Italian Stock Exchange since June 2001, and is currently included in the FTSE IT Mid Cap index. It currently has 4,400 employees worldwide.



#### INTERMAC

Intermac is the Biesse Group division that handles the production and sale of equipment and systems for machining glass, stone and metal. Established in Pesaro in 1987 by Giancarlo Selci, it rapidly managed to achieve a leadership position in the sectors it operates in and has earned the trust of successful companies that operate in a variety of industrial sectors, from construction to interior design and from the automotive to the aviation industry. Through a vast and extensive distribution network of branches, dealers and agents, Intermac offers attentive, personalised assistance to customers, from pre-sales consultation to post-sales and spare parts services. The majority of the brand's manufacturing activities take place at the Intermac plant in Pesaro, where the company's production area spans around 30,000 square metres, employing more than 300 staff. In addition, the company also has a further site in Dongguan (China).



ries, which are essential for the operator, for the installation of Intermac Master and Vertmax machines.

#### Grinding wheels, drills and more

With a new design and excellent edge finishing, Diamut's range of cup grinding wheels is suitable for every type of machine available on the market, especially those to be used with straight line line and double edger machines. Other products at the stand included drills, mill cutters, discs and all peripheral grinding wheels.

Diamut has also increased its investments in new production plants, opening its first production plant in the United States, inside the Charlotte Campus in North Carolina: a site specifically dedicated to the assembly of diamond tools, using Italian technology for the machining of glass, stone and ceramics.

#### New online platform

The new diamut.com online platform was also launched during Vitrum, with ease of navigation, allowing customers to find tailored solutions to meet their needs. The new website is features

restyled graphics, which bring it in line with Diamut communications, as well as increased potential, to increase the number of business opportunities through a flexible, modern interface that puts the product in the spotlight of a strategy tailored to each market. The increasingly vertical website differentiates the product offer for customers who are seeking out specific products for glass and stone. For each material, the user will find relevant content capable of meeting his/her needs and simplifying his/her searches.



#### Biesse Group



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# CHINA GLASS 2020

## 31st China International Glass Industrial Technical Exhibition

Shanghai New International Expo Centre

April 14-17, 2020

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**Supporter: Shanghai Ceramic Society**

**Contractor: Beijing Zhonggui Exhibition Co., Ltd.**

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# Skill Glass

20 YEARS OF HIGH-TECH, HIGH-QUALITY, RELIABLE MACHINERY



With 20 years of activity in the design and construction of glass processing machinery, the company in this article - Skill Glass - speaks about its beginnings, important developments and recognition of the highest quality and reliability of its products over time.

Skill Glass, based in the area of Alto Vicentino, one of the most industrialized and advanced areas of Europe, has, as its main product line, vertical lines for the grinding, drilling and milling of glass; high quality systems that offer high technology and innovation, able to satisfy the most demanding requests of clients.







## THE BEGINNINGS

The company, founded thanks to the experience of Beniamino Dal Santo, designs and builds glass processing machines, working alongside a team of top-level engineers and technicians.

One of the most important success stories of Dal Santo is that of innovative numerical control machines, which, at the end of the 1980s, during the Vitrum and glasstec fairs in Milan and Düsseldorf, left customers and competitors stunned.

This important development was followed by a patented NC beveller with 5 axes; also unique in its category.

In 1999, Dal Santo decided to found this new company with his children, developing what for him had to be the main features of his machinery: high quality and reliability over time.

## MOVING TO VERTICAL

The first vertical for drilling and milling was designed in 2001, and was destined to change the history and development of glass processing. From that moment the company decided to focus everything on 'vertical' processing, developing new and innovative projects.

Vertical high-technology is a fundamental feature to enable to optimize the use of space, above all with regards to movement of large-sized glass sheets, ever more requested and in use nowadays.

At the Schio site, advanced solutions are designed and created, always paying attention to ease, intuitiveness and ease of use.

The Skill Glass brand range includes large machines that can be used both in the stand-alone version and in line with

other systems: vertical drilling and milling machines, grinding and polishing machines as well as special machines and systems on request.

The in-house team deals with the design, development, assembly and testing of all the machines marked Skill Glass. All the structures and the mechanical components are made by highly specialized companies from the upper Vicenza area while customer assistance is provided by highly qualified personnel directly on site in order to give clients rapid and efficient assistance.

## HIGH QUALITY AND RELIABILITY

The recognition of the highest quality and reliability over time of the company's products is confirmed by sales, which have now reached all areas of the world. Skill Glass

machines are, in fact, present, as well as in Italy and throughout Europe, also in the Americas, Russia, China, Egypt, Singapore and Australia. Many customers have purchased more than one plant thus demonstrating, once again, the great reliability and competence of Skill Glass.

Skill Glass Srl



VERTICAL CNC CENTERS

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Whether it concerns model window panes with extreme radii, portholes that are several centimetres thick or quadruple insulating glass units, hardly any glazing units leave the Porta Glas Design factory without Edgetech's flexible Super Spacer<sup>®</sup> Warm Edge spacer system - some 600 kilometres a year - and it is an upward trend. This is because the main clientele, i.e. the market for high quality tailor-made entrance doors, is growing at a stable rate. At Porta Glas Design an insulating glass line is in operation, that is unique throughout the whole of Germany, in order to facilitate the fulfilment of individual customer requirements even more rapidly and economically.

# Edgetech

## EFFICIENT VARIANT MANAGEMENT AT PORTA GLAS DESIGN

**T**he megatrend of customisation is not a new thing. As long ago as 1997 the trend researcher, Faith Popcorn, described the essence of "egonomics": I stipulate goods and services that are tailored to my own personal preferences. She was only wrong about one



The insulating glass production is designed to cope with the greatest possible variety of glass sizes

Virtually every single glazing unit is unique

© Porta Glas Design



© Edgetech

thing, she had suspected that the trend had already peaked back then. Now, in 2019, one does instead sense that the trend is experiencing its second wind.

## A WIDE VARIETY OF FORMS IS A MUST IN THE FRONT DOOR MARKET

The front door market has, in the premium-price segment, always been a market which focuses on customisation as opposed to mass produced items. The customer has his customised door assembled by a component trader or a carpenter. Wooden, aluminium, steel or plastic, brushed, powder-coated, glazed or lacquered doors in various colours, with glass elements or stainless steel applications, doors that are particularly burglar-proof, thermally insulated or soundproofed - there are virtually no limits to customers' wishes. The receipt of the order by the front door panel manufac-

turers sets the downstream delivery chain in motion within the shortest space of time.

The variety of glass elements for front door panels alone is something to behold. The glass processing and refining company Porta Glas Design in Porta Westfalica constantly has around 160 different types of ornamental glazing units in stock. However, in a large number of cases, in-house finishing is employed. "Nothing should be beyond us", explains plant manager Katja Neumann, "customers' wishes are only restricted by some physical and economic limits."

The factory continues to make use of traditional glass making skills. Triangles, ellipses and any free-form designs are mounted here to form insulating glass units. "In the case of these customised and extremely small-format glass sections, only a flexible spacer such as Super Spacer<sup>®</sup>, which can be



## EDGETECH EUROPE GMBH

Edgetech's Super Spacer<sup>®</sup> flexible foam-based spacer systems act as energy-efficient warm edge spacers in insulating glass windows. They significantly reduce energy loss to the outside, largely prevent condensation and also contribute to the lifetime of a window. On average, worldwide, more than 300 million metres are sold annually in over 90 countries. Edgetech Europe GmbH, located in Heinsberg Germany, is a fully-owned subsidiary of Quanex Building Products Corporation, an industry-leading manufacturer of components sold to Original Equipment Manufacturers (OEMs) in the building products industry. Based in Houston, Texas, Quanex designs and manufactures energy-efficient fenestration products, in addition to kitchen and bath cabinet components. Regarding the turnover Edgetech/Quanex is the world's largest manufacturer of spacers. Edgetech Europe GmbH is a sales location for the markets in continental Europe and one of the three worldwide Edgetech production plants, with a total of 450 employees and 16 extruders. You can obtain additional information about the Super Spacer<sup>®</sup> systems and the Warm Edge Technology of Edgetech here: [www.superspacer.com](http://www.superspacer.com).

positioned precisely along the contours, is a viable option," according to Katja Neumann. In the case of front doors with glass elements, the warm edge with all its advantages represents an additional selling point.

The range of finishing options is also something to behold: laser engraving, customised sandblast matting effects, application of

stainless steel, integrated LED light, Swarovski crystals and glass applications, paintwork, facet grinding, Tiffany glass, domed glass or fusing effects and upon request the house numbers, the company logo and customised sample requests can be produced. Every trainee at Porta Glas Design does of course also learn how to manufacture genuine lead glazing.

Glass elements for premium front doors are produced at Porta Glas Design

## AUTOMATED MANUFACTURE OF INSULATING GLASS PRODUCTION IN BATCH SIZE

Set against this you will find high-tech in the neighbouring hall, in the form of a LiSEC insulating glass production line that is unique throughout the whole of Germany. It is designed for the economical manufacture of double to quadruple standard glazing units that are up to 100 mm thick. Depending on the order received and the customers' requests, extremely small formats ranging from sizes of 130 x 230 mm to large formats of 1,500 x 3,000 mm for fully glazed side sections are run through the machine. The manufacturing process is fully automated, ranging from the washing, drying and sorting to the application of the spacer, the filling of the panes with gas, the compression work and the sealing.

"We only provide the glazing that has been cut to size. All the variable parameters such as the size, thickness, pane structure,

required spacers and the jointing compound applied are recorded in the production system, the automatic line subsequently processes each glass format and without any need for manual intervention", explains Katja Neumann. Highly flexible solutions are required for this ingenious variant management system. In this way the application robot can access eight different widths of between 8 mm and 24 mm of Super Spacer® T-Spacer™ Premium Plus in parallel without having to change a reel from the stock magazine. The automation is also one of

the things that guarantees such a high level of quality. Not even the smallest error in the glass will be tolerated, not even the smallest spot may be visible on the spacer.

### PLACING THEIR TRUST IN SUPER SPACER® FOR THE LAST 22 YEARS

Edgetech has only just celebrated its 30th anniversary. It has been supplying Porta Glas Design for 22 of those years. The glass finisher already opted in favour of Super Spacer® within a year of being founded. Joachim Stoss, managing director of Edgetech Europe GmbH in Heinsberg, is of course delighted about this. "Our Super Spacer® proved itself to be extremely flexible in three respects", according to Joachim Stoss. "The foam-based material composition facilitates its precise application in parallel,

Edgetech Europe GmbH

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and adapts to the pumping motions of the insulating units caused by the weather. Thirdly, it provides the necessary flexibility for the automated manufacture of series and variants." All the well-known machine manufacturers offer solutions for the automated production of insulating glass elements using Super Spacer® systems, which also streamlines the entire manufacturing process. Steps such as the cutting to size, bending and filling of the spacers with desiccant are no longer required.


The applicator accesses eight different Super Spacer® widths in parallel



# HEGLA

## SHORTENING CYCLE TIME IN LSG CUTTING

Vitrum is the first event where HEGLA will present a new heating technology that accelerates the automatic cutting of laminated glass by around 20 per cent and significantly reduces the risk of delamination by applying heat locally.



A new heating system developed by HEGLA promises a significantly shorter heating time for LSG film and thus for the dominant sub-process that – up to now – has taken up most of the time needed for cutting LSG. The heating time is reduced to less than half thanks to the diode laser heating now in use. In future, this method could replace the conventional infrared tube as a heat source, especially in series production. Once the film has been heated, it can be drawn up to form a small gap in the score-and-break area of the pane laminate and then automatically separated by a knife passing through it.

### RESULTS WITH RAPIDLAM

HEGLA was very satisfied with the results achieved on the RapidLam cutting system as the technology carrier. As a result of the new heating solution,

Scoring, breaking, heating and separating is the tried-and-tested rule of thumb used to describe the mechanical separation of laminated glass. The Beverungen-based mechanical engineering company HEGLA, which specialises in the glass industry, is currently demonstrating that it might be worth taking a closer look at, and even improving, procedures of this kind — even if they are already considered mature.

productivity — measured in cuts per hour — increases by an average of 20 per cent in a system that is otherwise the same.

“With our new process, the cutting process sequence itself remains unchanged,” explains HEGLA Managing Director Dr Heinrich Ostendarp regarding

in a row on a swivelling strip. The diodes generate a laser beam that oscillates longitudinally while applying power evenly to the film between the two opposing score marks.

HEGLA presented the innovative heating technology to the public for the first time at Milan’s Vitrum 2019. The new system could be closely observed on the LSG cutting system RapidLam.

### ADVANTAGES OF LASER DIODE HEATING

The advantages of laser diode heating come not only from shorter processing times and the ability to significantly increase the throughput of LSG systems on the same production area. Dr Ostendarp also describes a positive effect on the edge quality achieved with this process: “Due to the short-term, concentrated energy input limited to a narrow line, the LSG film and the glass at the edge of the laminate are significantly less heated and stressed. In structural glaz-

the development approach for the heating system. “Instead, we use the diode lasers to intensively heat the film exactly where it is needed, concentrate the thermoplastic heating even more precisely on the cutting area than before, and thus significantly reduce processing time,” says Dr Ostendarp.

In the new process, the diode lasers are arranged



ing in particular, and for all applications in which the glass edges are visible, the laser diode system offers even higher quality assurance compared to conventional heating and cutting technologies, and also minimises the risk of later complaints or drops in quality. This process thus eliminates one of the existing causes of a possible later detachment of the film from the glass in the edge area. The technique could be described as a “cold heating process” in so far as the glass edge immediately after separating is only as warm as a human hand.

### Also for laminated glass

Tests to date have also been positive for laminated glass types where high-strength and thicker films are processed. Processing time

could be significantly reduced and the edge quality improved; depending on the film, this could mean a mechanical cutting process is now possible.

### COOPERATION WITH HEGLA BORAIIDENT

The advancement of this technology is one of the results of the cooperation between the machine manufacturer HEGLA and the laser specialist HEGLA boraiident from Halle/Saale, which has been part of the HEGLA Group for two years. “Once again,” according to Bernhard Hötger, Managing Director of the HEGLA Group, “we see what innovations are possible when the expertise of the various specialists comes together and a new solution is created hand in hand.”

He gla GmbH & Co. Kg

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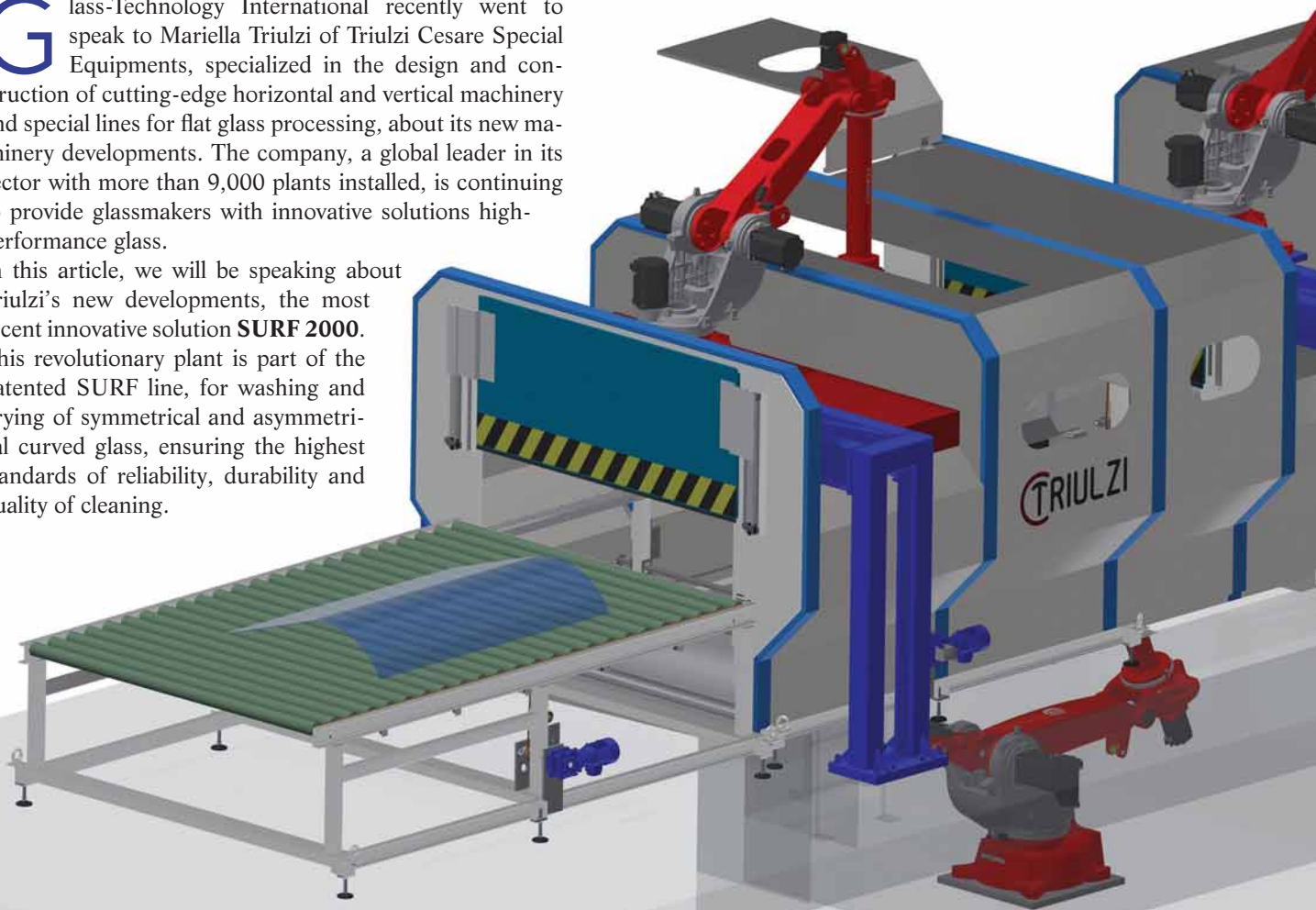


# Triulzi

## MOVING WITH THE TIMES WITH HIGH PERFORMING GLASS PROCESSING

Glass-Technology International recently went to speak to Mariella Triulzi of Triulzi Cesare Special Equipments, specialized in the design and construction of cutting-edge horizontal and vertical machinery and special lines for flat glass processing, about its new machinery developments. The company, a global leader in its sector with more than 9,000 plants installed, is continuing to provide glassmakers with innovative solutions high-performance glass.

In this article, we will be speaking about Triulzi's new developments, the most recent innovative solution **SURF 2000**. This revolutionary plant is part of the patented SURF line, for washing and drying of symmetrical and asymmetrical curved glass, ensuring the highest standards of reliability, durability and quality of cleaning.



Machine structure is made of AISI 304 stainless steel, guaranteeing maximum quality and durability. The line is also equipped with a PC touch screen panel for advanced management of the machine and interfacing with high-level control systems of the work process and SURF is also supplied with a specific 4.0 kit

## SPEAKING TO MARIELLA TRIULZI

**GTI:** What sizes of curved glass can this machine process?

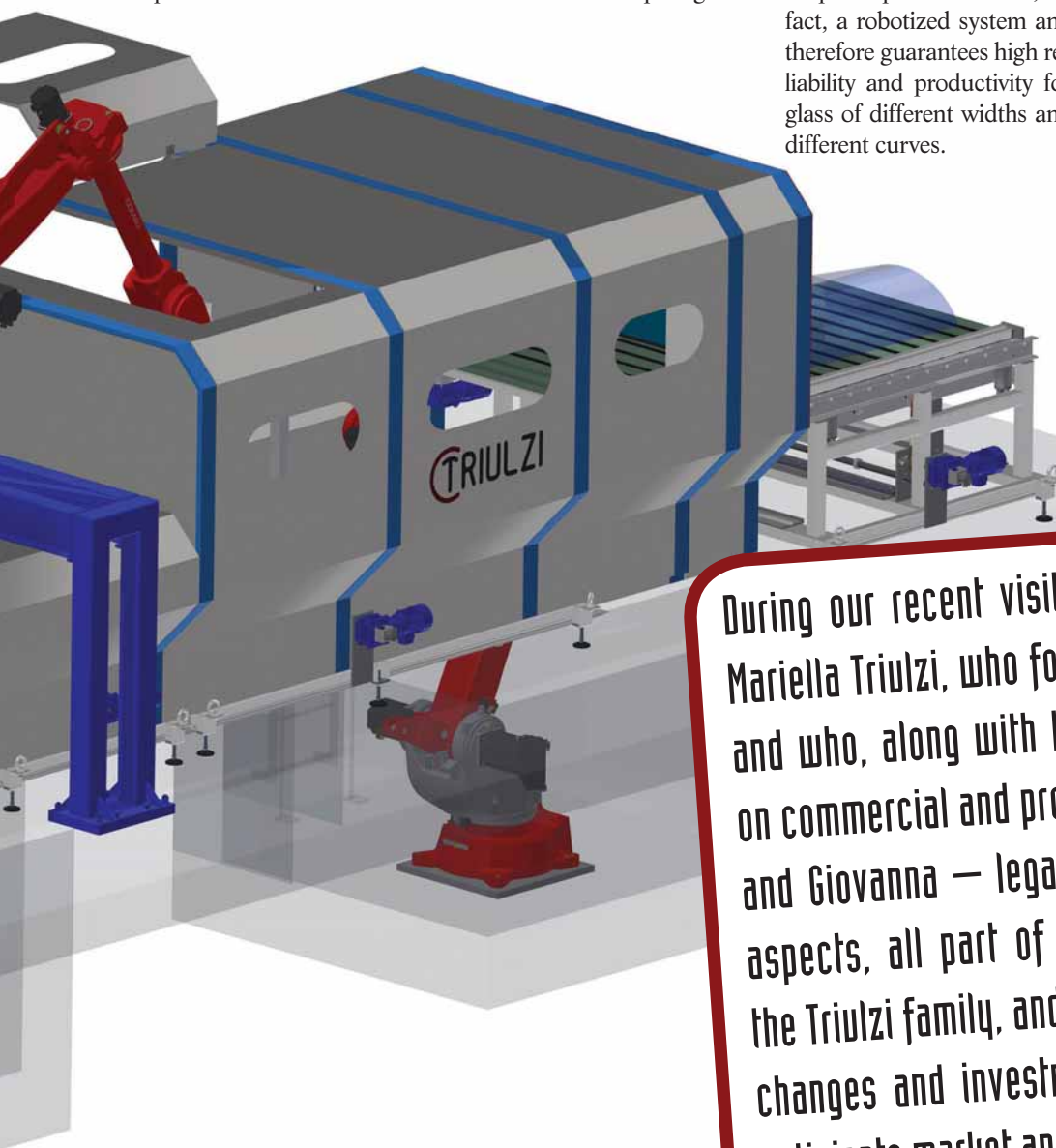
**Mariella Triulzi:** With regards to curved glass, we are speaking about two-metre glass sheets for a cross stroke up to 450mm, tailor made on request up to 3300mm Jumbo size. This is a new concept of glass



washing machines, in which the machine washes glass that is already curved to the shape required. This is, in fact, a robotized system and therefore guarantees high reliability and productivity for glass of different widths and different curves.

**GTI:** So this means that there is nothing to change or adapt to the glass size and curve?

**Mariella Triulzi:** No, thanks to in-house developed software, the machine 'reads' the size and shape of the glass to be washed. This means that the glass leaving the machine is perfectly cleaned and ready for all secondary processes. It can operate automatically is an important benefit. We are, in fact, the only machinery manufacture to work this way with curved



During our recent visit to Triulzi, we spoke to Mariella Triulzi, who follows marketing aspects, and who, along with her sister Roberta, works on commercial and production planning aspects, and Giovanna — legal, financial and personnel aspects, all part of the second generation of the Triulzi family, and are now making important changes and investment to respond to — and anticipate market and client needs and demands.



glass and, in fact, we have patented this solution.

**GTI:** What kind of foundations/flooring does a washing machine line of this type need?

**Mariella Triulzi:** Here in our workshop, the line is supported by a special platform but the end client will need to prepare suitable foundations to accommodate the robot below the washing machine. In any case, the machine has been designed with a modular style to be assembled on-site in the shortest time possible.

We are also developing robotic handling solutions for the areas before and after the washing machines, and we are, in fact, more and more living up to our name which is 'Triulzi Special Equipments'. So we are responding increasingly to our clients needs and demands, an important characteristic of machinery

## MADE IN ITALY EXCELLENCE

All Triulzi's machines and plants are made entirely in Italy, therefore guaranteeing:

|                               |  |
|-------------------------------|--|
| <b>Increased productivity</b> | improved washing and drying processes, continuity of production over three shifts, cycle time 60";     |
| <b>Extreme versatility</b>    | possibility of processing all sizes, thickness range 3-12 mm;  |
| <b>Utmost reliability</b>     | distinctive feature of all Triulzi products  |
| <b>Long working life</b>      | guaranteed thanks to high quality stainless steel structure;   |
| <b>Ease of use</b>            | high level automation with PLC touch screen;   |
| <b>Reduced maintenance</b>    | reliability of components and construction materials, machine designs that guarantees easy inspection; |
| <b>Low noise levels</b>       | innovative soundproofing solutions   |
| <b>Low consumption levels</b> | reduced needs for water and electricity, reduced consumption/limited demand                            |
| <b>Highly configurable</b>    | integration into industry 4.0  |

manufacturers in today's glass industry. We are also changing some aspects of the company, with focus on experienced engineers.

**GTI:** Tell us about Triulzi and recent developments in the company.

**Mariella Triulzi:** There has been an important generational change, which started about three years ago, also involving new de-

velopments and important investment, above all in R&D and reengineering. We are also carrying out a process of lean production, which involves the optimization of down times and production flow, in addition to a digital platform to improve service.

**GTI:** What about turnover?

**Mariella Triulzi:** With regards to turnover, we will

see an important increase thanks to special plants along with our regular production of standard plants, so our turnover forecast is, in fact, looking positive for the next years.

**GTI:** What about near future goal ?

Nowadays we are completing the procedures for the new branch in the United States, TRIULZI NORTH AMERICA, as it is very important to have a local presence and to provide the best service.



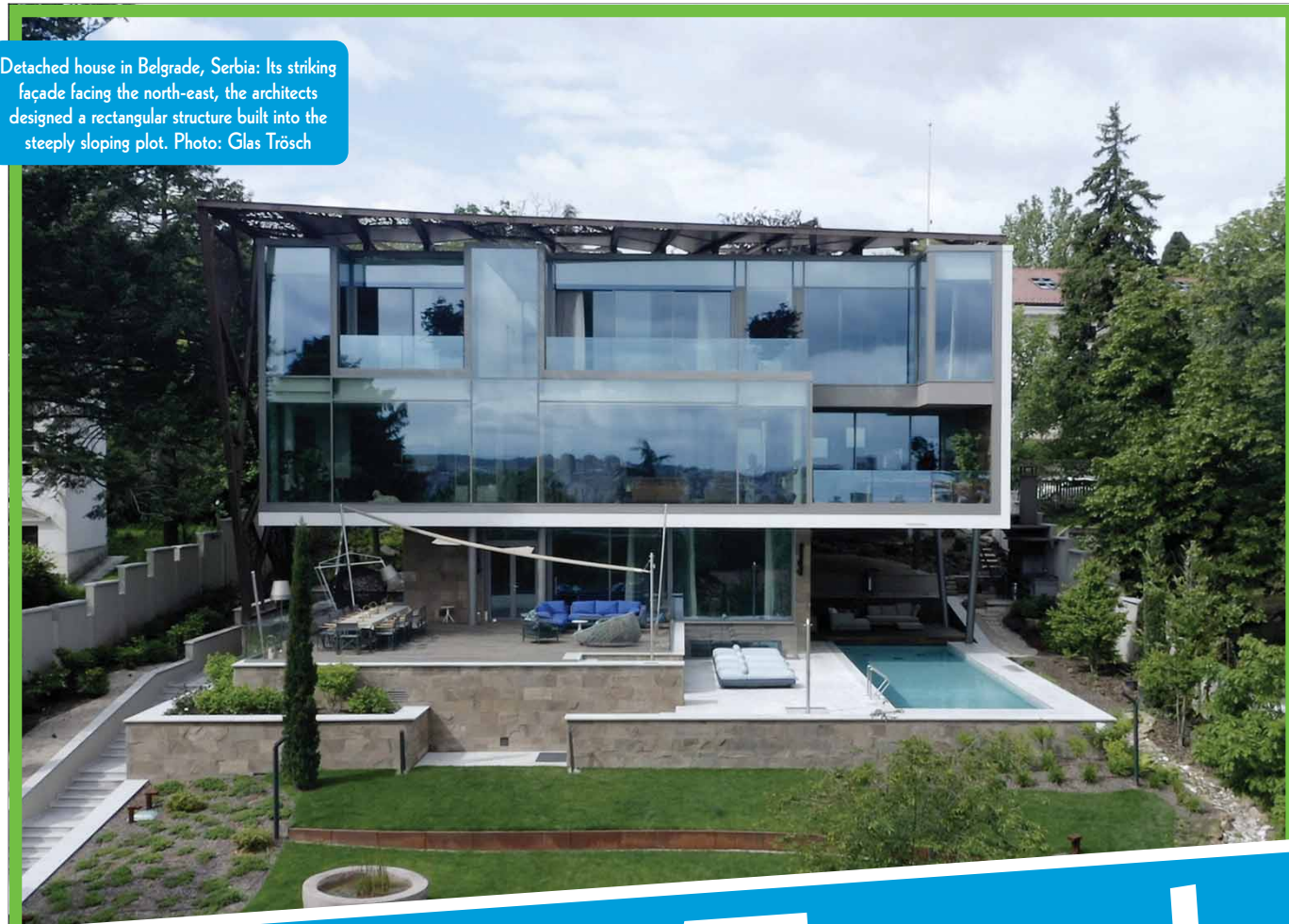
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Detached house in Belgrade, Serbia: Its striking façade facing the north-east, the architects designed a rectangular structure built into the steeply sloping plot. Photo: Glas Trösch



# Glas Trösch

A SPECTACULAR HOME  
WITH A VIEW TO MATCH IN  
BELGRADE WITH SUPER  
ENERGY-EFFICIENT GLASS



In a suburb of the Serbian capital Belgrade, a private developer fulfilled his dream of a spacious, airy home with pleasant views of the city. Situated on a sloping plot, the detached house designed by local architects Autorski Atelje Spajic features a stunning transparent building envelope with glass from the Swiss specialists Glas Trösch. In addition to their functional properties, the wide variety of glass solutions are particularly notable for their visual homogeneity and contemporary colour scheme.

that the overall structure, despite its volume, appears to float gently in the air. In keeping with this aesthetic, it is accessed by a bridge connecting the south-west aspect with the first floor of the building. Transparency and light, however, are also conveyed by the liberal use of glass in the impressive façade design.

**MAXIMUM USE OF DAYLIGHT FROM THE NORTH-EAST ELEVATION; THE MOST EFFICIENT SOLAR SHADING ON THE SOUTH-WEST ASPECT**

To the north-east, with its unobstructed views of the city, the house was fully glazed with pane dimensions of up to 6.0 x 3.21 metres, giving the residents

a panoramic vista of the surroundings. Because the orientation of the building means it is not generally exposed to excessive sunlight, the choice of façade glass emphasised a high level of light transmittance and a pleasant appearance. In addition, the biting cold of some winter days in Belgrade required a lower heat transmission coefficient. The architects thus selected triple insulated glass coated with SILVERSTAR COMBI Neutral 70/35 from Glas Trösch on position 2. To improve thermal insulation, the inside of the inner pane (position 5) was additionally coated with SILVERSTAR Low-E. Krypton gas was also used instead of air between the panes, thereby reducing

With its striking façade facing north-east, the architects of this spacious, airy home in a suburb of the Serbian capital Belgrade, designed a rectangular structure built into the steeply sloping landscape. The architects were especially concerned to keeping the building's footprint to a minimum: some parts of the house are simply supported on the slope, such



The architects were especially concerned to keep the building's footprint to a minimum: some parts of the house are supported on the slope, such that the overall structure appears to float gently in the air. Photo: Glas Trösch

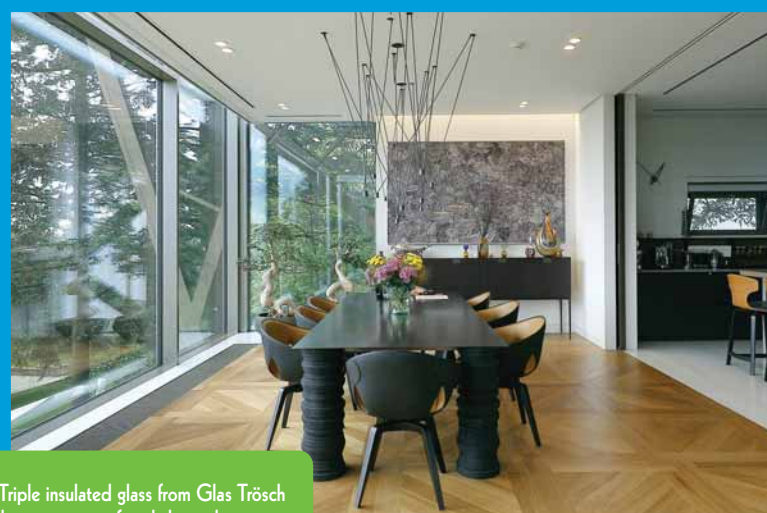
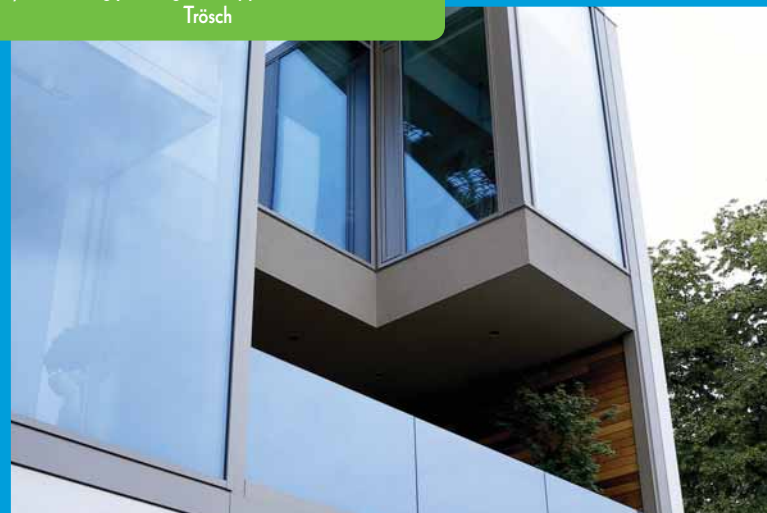
the Ug-value to 0.5 W/m<sup>2</sup>K. Overall, this produces a remarkable light transmittance of 61 per cent. Large loggias and terraces, all fitted with glass railings, add to the airy and transparent impression of the building on the north-east façade. Particularly worthy of note is the perfect match between the railing and façade glass, which both use the exact same colour scheme.

## STRUCTURAL SOLAR SHADING CONTRASTS WITH STRICT CUBATURE

One fascinating architectural detail is the metal structure that projects from the roof of the building and protects the façade and the large terrace from direct sunlight. The asymmetrical "awning" with its almost oriental patterns presents an interesting contrast from the more rigid cubature of the building and lends the house an almost mystic character. At

the building's rear, which thanks to its south-west aspect is exposed to far more sunlight, the metal structure is also used vertically in front of the façade, thus increasing the shading effect. This side of the building is more economical in its use of glazing but still sufficient to withstand the high summer temperatures in the Balkans. The SILVERSTAR COMBI Neutral 61/32 coating was used on position 2 in the windows, which also feature triple insulated glass, combined with a low-E coating on position 5. To improve protection against forced entry, the insulated glass in part also uses laminated safety glass (LSG). With a total energy transmittance of just 26 per cent, extremely efficient thermal protection is guaranteed, without compromising on thermal insulation in the winter (Ug-value 0.4 W/m<sup>2</sup>K). Light transmittance is 47 per cent, for insulated glass with LSG 46 per cent.

A perfect match: the colour scheme used for the railing and façade glass matches exactly and lends the glass façade a strongly homogenous appearance. Photo: Glas Trösch



Triple insulated glass from Glas Trösch lets in a great deal of sunlight to the rooms facing north-east. An excellent heat transmission coefficient ensures comfort on cold winter days. Photo: Glas Trösch

All in all, this ensures an extremely pleasant residential atmosphere in all seasons, complemented by low energy consumption – giving the owners a wonderful outlook in every respect.

Glas Trösch AG

glaströsch

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|                                       |   |
|---------------------------------------|---|
| <b>Project:</b>                       | Detached house  |
| <b>Location:</b>                      | Belgrade, Serbia  |
| <b>Completion:</b>                    | 2019  |
| <b>Architect:</b>                     | Autorski Atelje Spajic, Belgrade, <a href="http://www.aaspajic.com">www.aaspajic.com</a>  |
| <b>Insulating glass manufacturer:</b> | Glas Trösch GmbH, Nördlingen (D)  |
| <b>Glass structure:</b>               | North-east façade: Triple insulated glass with 8 mm LSG, SILVERSTAR COMBI Neutral 70/35 coating on position 2, SILVERSTAR Low-E coating on position 5, 14 mm gap between panes filled with krypton  |
| <b>South-west façade:</b>             | Triple insulated glass with 8 mm LSG, SILVERSTAR COMBI Neutral 61/32 coating on position 2, SILVERSTAR Low-E coating on position 5, 14 mm gap between panes filled with krypton, partial use of laminated safety glass comprising 2x 6 mm and 2x 0.38 polyvinyl butyral (PVB) film. |





# CAM

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Coherent

# VDMA

## MORE THAN JUST TRANSPARENCY

Glass isn't just glass anymore — it has become a smart component for a wide variety of applications. Laser technology makes it possible to meet customer specific requirements precisely, quickly and cost-effectively.

A smart pane of glass should ideally screen, be transparent, darken, and lighten, with users being able to program these functions at any time of day or night. Whether it is in a public building, on a luxury yacht, in a car, or simply at home from the sofa, glass has to work. State-of-the-art technology during production is needed for this to succeed.

Rail passengers will be delighted if their high-speed train has windows that shield them from the sun's rays while at the same time allowing mobile phone signals to pass through, and the same applies to office buildings,

which contain a lot of concrete and steel. Smart glass facades ensure a comfortable interior climate, individually regulate light and shade to fit the requirements





of employees, and permit mobile communication without interference, using technology that is invisible to the human eye.

### LAYER BY LAYER

Glass designed to shield against electromagnetic radiation is always coated, for example with a low-E coating, to reflect thermal radiation. Laser beams make it possible to remove part of this coating, creating a filter structure or surface that is permeable to mobile phone signals or near-infrared light. 4JET microtech GmbH specializes in the micro-machining of very large, flat and curved panes of glass. Serial production of curved windshields demands high-resolution production ( $< 100 \mu\text{m}$ ) and extremely short cycle times at volumes of up to  $2000 \times 1200 \times 300 \text{ mm}^3$ . It is possible to remove entire areas of coating on these panes so that sensors have a clear view through the windshield at a cycle time of less than 30 seconds.

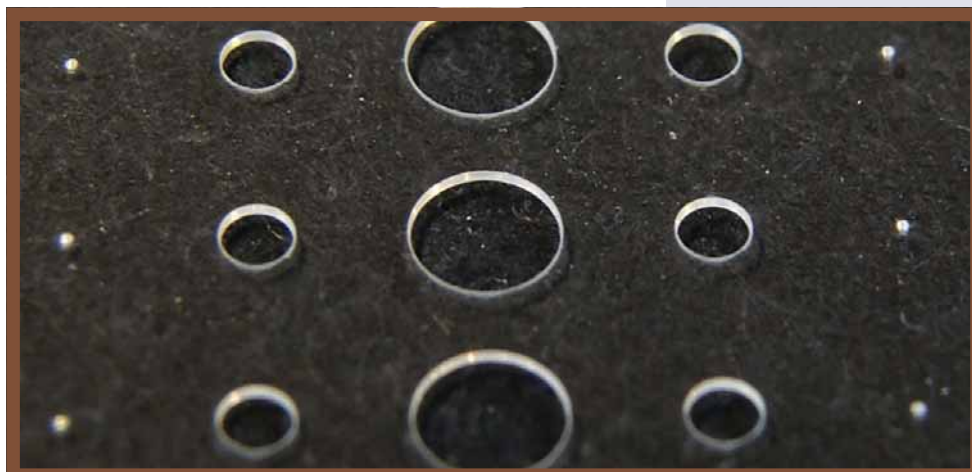
Another challenge for laser processing is posed by smart windows, which contain two electrodes between which there may be liquid crystals or electrochromic materials that are actively switched by the electrodes. When an electrical voltage is applied, these coatings either become opaque or darken. The laser can structure the electrodes into seg-

ments to make them appear more homogeneous. The track width during structuring can be as low as  $10 \mu\text{m}$ , with the glass

substrates measuring over  $2 \times 3 \text{ m}^2$ , and the processing system is designed to run on a production line 24/7.

### TAKING INSPIRATION FROM SHARKS

State-of-the-art technology from 4Jet can cut fuel





costs for aircraft and ships. Fine grooves about the diameter of a human hair – riblets – are incorporated into the paintwork to significantly reduce air resistance. This “shark skin” effect is achieved using LEAF (Laser Enhanced Air Flow) technology, which uses laser interference texturing, where the laser beam is first split and then recombined. This allows the oscillations of the electromagnetic fields of both partial beams to be superimposed in a controlled manner, resulting in a pe-

riodic pattern within a single laser spot. This method makes it possible to create 1 m<sup>2</sup> of riblet surface in less than a minute.

### MADE TO MEASURE

Lasers need to meet entirely different requirements when used in the production of goblets. The aim here is to separate the cap from the goblet and create a pleasantly shaped mouth rim. In the conventional two-stage process, a small flame was first used to heat the glass locally, after which a CO<sub>2</sub> laser took

over. In the second stage of the process, thermal stress was induced to snap the cap off, which was done using a cold stream of air, for example, after which the cap then had to be removed mechanically. The original cutting process required extensive post-processing of the mouth rim such as grinding and flaming. These subsequent processes took a lot of time and resulted in additional costs, while also resulting in additional breakage. This is avoided with laser systems in which Coher-

ent's SmartCleave™ process is used. The company originally developed the process and the laser systems to process untempered and tempered flat glass. It then adapted this method for goblet glass production in cooperation with iPROTec. The goblet hangs in a fixture at the top so that the cap drops down at the end of the process. In the first step, an ultra-short pulse (USP) laser produces thin filaments in the glass in the infrared spectrum (1030 nm). One pulse corresponds to a filament with a diameter of 0.5 to 1 μm. Depending on the type of glass, the system can cut glass up to 3 to 4 mm in thickness in a single pass. The pulse duration, pulse shape and non-linear optical effects in the glass are decisive here. Glass up to a thickness of 12 mm can be perforated in this way, but several passes are required for thicker glass. The thermal stress subsequently applied causes the glass to break along the filaments with high precision. In addition to this high accuracy, the quality of the edges is very high, with a surface roughness in the region of 0.5 μm. Depending on the application, this means that post-processing steps can be done away with, saving time and money and reducing the environmental impact. If the glass is too thick and too large or if the contours to be cut are too simple, the economic



advantages of the process are lost.

The SmartCleave™ process is not only used in the production of tableware, but also in medical technology, in the production of glass wafers, as well as display and cover glasses. SmartCleave™ laser sub-systems can be integrated into any existing system. The more demanding and intricate the task, the more suitable the process is. Even closed contours can be cut out, as long as the aspect ratio is not too large and the holes aren't too small. For very intricate

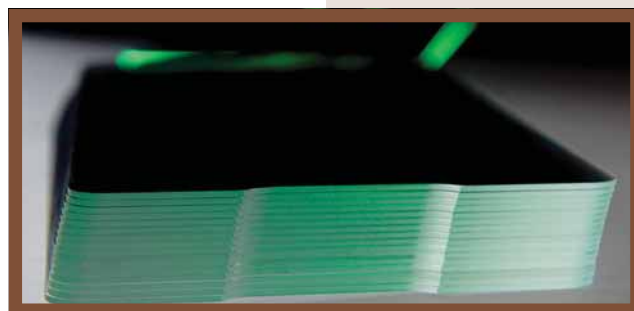
holes smaller than approx. 2 mm, Coherent offers another method: ablation and "milling" with ultra-short pulse lasers, all of which is contactless, toolless and can be integrated into other systems.

### WHO ARE YOU AND WHERE ARE YOU FROM?

Track and trace is another buzzword. Nanosecond lasers in the UV range, USP lasers in the green range or in the red range are particularly suitable for structuring and marking glass. The shorter the pulse, the less damage is done to the glass because no heat is transferred into it. The structures are formed in the micrometer range. If 100 percent traceability and identification of products is possible, it will be more difficult to put counterfeits on the market, increasing safety for users and consumers.

### FASTER PROCESSING AND HIGHER EDGE QUALITY WITH THE LASER SWORD

Cutting laminated safety glass is still a time-consuming task in comparison to float glass. One time and cost driver is the time it takes to heat the laminated film after breaking. As a rule, an infrared heater is used for straight cuts, which heats the film so that it can be separated mechanically in the next step. Heating is compara-



tively time-consuming and is not particularly precise, but covers a broader area, which can cause delamination at the edge of the glass. HEGLA GmbH & Co. KG is already experienced with laser technology during mould cutting. In collaboration with the laser specialists at HEGLA boraident, it came up with the idea of accelerating the heating process for straight cuts using a diode laser and at the same time improving the edge quality. The results are impressive. The "laser sword" heats the foil precisely where it is needed with individual laser diodes, which are positioned in a straight line. Thermoplastic heating is concentrated on where the cut is required with even greater precision than before. Numerous parameters are used to individually control the required power density, including the diode current and spacing as well as the oscillation path and the oscillation speed. The heating process is thus more than halved, allowing the user to save a considerable amount of time and money when processing large quantities, and delamination is a thing of

the past. Diode lasers also have a longer service life than infrared heaters. Even special foils made of harder materials are easy to cut using this laser technology. This new "cold heating process" adds value to the product wherever edges of cut laminated glass can be seen and in structural glazing. In serial cutting in particular, diode laser heating could replace the infrared tube as a heat source and quickly recoup the additional investment simply due to the significantly higher productivity with otherwise the same system.

The new heating technology was presented for the first time at Vitrum in Milan, where it was integrated into a prototype system for demonstration purposes.



VDMA - Forum Glastechnik



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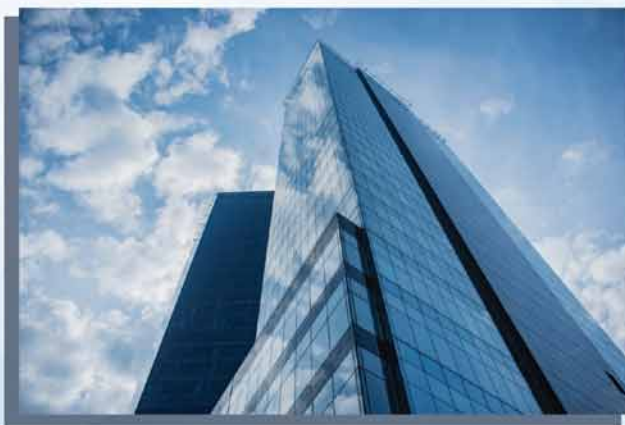
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# Cugher Glass



RESPONDING TO - AND  
ANTICIPATING - THE NEEDS  
AND DEMANDS FOR  
FLAT GLASS SOLUTIONS



With its over 50 years of activity in the design and manufacture of screen printing machines for flat glass, Cugher Glass is continuing to innovate and develop its machines to respond to the most recent trends of the market, now even more focused on energy saving and environmental protection.

**F**or over 50 years Cugher has been designing and manufacturing machines and systems for silk-screen printing on flat glass, integrating its offer with solutions dedicated to drying, automation, process control, handling, storage and quality control. Cugher is recognized as one of the most innovative and technologically advanced manufacturers, especially in the Automotive market, where it represents the ideal partner offering solutions for all types of glass. Thanks to in-depth knowledge of the production processes in which its technologies are integrated, Cugher responds quickly and effectively to the needs that emerge from the sector, often anticipating them.

#### **INTEGRATED SYSTEMS FOR COATED GLASS**

Recent trends in the automotive and architectural application sectors are

J series printing machine in line with IR dryer



massively oriented towards the use of low-E glass coating systems so that they can significantly reduce

the power of air conditioning systems. Basically, the mechanism takes IR and UV energy from sunlight

in order to reduce the demand for air conditioning during the summer period. Cugher Glass, which has

always considered the Automotive and Architectural sectors as its production drivers, is constantly in touch with the main players of the sector and focuses its research and development activities on the needs coming from both sectors, sometimes also anticipating these needs.

When coating techniques began to have an important role in Automotive and Architectural glass production processes, Cugher had, given the incompatibility of these materials with screen printing techniques, to choose between two possible alternatives: to design its lines for screen printing on the opposite side to the coating side, or to make sure that the glass arrives on the printing table with the coating trimmed.

In this second case the printing process takes place as usual: therefore nothing changes for the operator except for more attention required for the handling of the glass sheets.

On the contrary, if the customer decides to keep the coating on the opposite side to that of the screen printing, the process becomes more complicated. Coated glasses do not withstand the typical mechanical actions of centring, and the glass must therefore be moved with the coating facing upwards until printing. The glass is centred upside down, and then turned over on the shuttle that takes it to the machine.



Centering for coating



Cugher's handling





After printing, everything proceeds as usual, apart from the adoption of full rollers to reduce the surface load on the coating.

## PRINTING SYSTEMS FOR PAIRED GLASS

Another issue of the Automotive sector is the management of paired inner/outer glasses: this kind of glass, whether windshields, side- or rear windows, are bent separately using the most modern 'press-bending' technology and only later they are paired, otherwise they are bent when already paired with the more traditional 'gravity' technology.

In the case of 'gravity' bending processes, coupling can take place just before the bending furnace - the most widespread solution - or at an earlier stage, immediately after washing the glass arriving from the cutting line. This second solution is adopted to substantially reduce the phenomena of contamination between the different layers. From the screen printing and handling point of view, this solution requires the creation of a more complex line: since paired glasses must be handled with a layer of powder in between them, which makes the two glasses free to slide, the handling and centring systems must be rethought for this particular specification.

The whole part of the line dedicated to han-

Roller conveyor for sidelites



dling must therefore be designed with particularly delicate acceleration and braking to avoid decoupling the glasses, in particular the screen printing machine must be designed to be able to centre the pair of glasses on the printing surface that otherwise would not maintain the registration.

The machines suitable for this type of process are both those that belong to the J series with belt conveyors, as well as the GB series with shuttle transport. In the case of the J series, the pair of glasses is handled on a belt conveyor, so it is important to pay attention to accelerations. In the case of the GB series, the pair of glasses is pre-aligned and then transferred to the printing table with a shuttle that blocks the two glasses, preventing mutual slippage.

In terms of quality the two machines offer exactly the same performance, however with the GB series machines it is possible to save time in handling glasses, optimizing the overall cycle time (180 pieces/hour).

### PRINTING SYSTEMS FOR LAMINATED SIDELITES

Sidelite lines require rather high cycle times and machines capable of handling particularly complex and highly asymmetrical glasses. Cugher has always produced screen printing machines capable of handling

complex shapes: in the case of automotive side glasses, the difficulty of asymmetrical shapes is added to the complication of the very low thickness of the glasses

to be printed. To meet the demand for high standards of acoustic comfort - more and more frequent in the world of luxury cars - Cugher has developed

a specific series of roller conveyors that complete the offer of lines dedicated to side windows. The choice of roller conveyors comes from the desire to



Glass printing

adopt barrier photocells that improve and simplify stops and centring of thin glasses.

Thanks to this Cugher is able to detect and manage

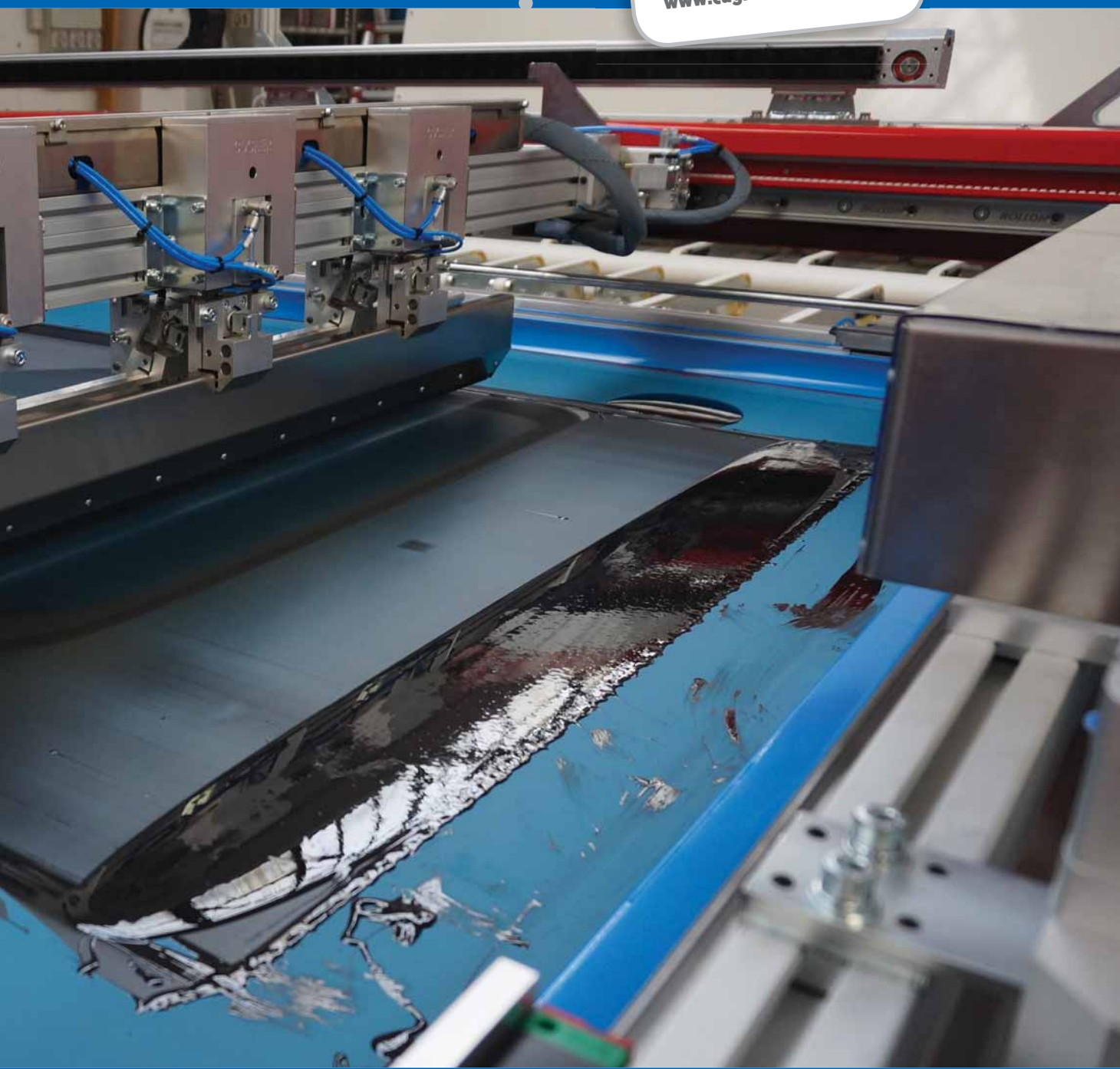
very thin glasses with complex shapes, without putting them at risk of impact in critical points such as corner tables, stackers and centring stations.

 Cugher Glass Srl



**CUGHER**  
Plants for glass screen printing

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# China Glass

BACK TO SHANGHAI  
AGAIN IN 2020





The 2020 edition of China Glass will be held in Shanghai, continuing to explore and innovate, in its aim to help glass makers and glass processors find new business opportunities, while promoting industry transformation and upgrading,



## **A** N OVERVIEW OF CHINA'S GLASS INDUSTRY

Thanks to the overall stable and progressive development of China's economy, the production of China's glass industry in the first half of 2019 was stable on the whole, with high-quality development, which are remarkable results in the transformation and upgrading of the industry, and increasing profitability. The total output of flat glass was 460 million weight cases, rising 6.8 per cent year-on-year by the end of June. There was a slight

increase in the output of the processed glass sector, including tempered glass, insulating glass and laminated glass. Total revenue of the flat glass industry reached CNY 32.9 billion from January to May, up 6.4 per cent year-on-year. The glass industry still keeps the growth momentum in output and profit under a downward pressure.

### **STRONG PROMOTION FROM THE GOVERNMENT**

The promotion of national policies and the internal demand for industrial transformation and up-

grading have brought multiple benefits to the glass industry. The Chinese government is strongly promoting the transformation and upgrading of the traditional construction industry to the construction industrialization, as well as promoting energy-saving technology and assembled buildings. A large number of enterprises in glass deep processing serving in the field of building energy conservation are showing great demand for accelerating the structural adjustment of products, improving craftsmanship and technology content, and promoting energy conservation and environmental protection. They are mainly focusing on the improvement of technological equipment and investment in environmental protection facilities. The innovation and upgrading of technical glass have brought new growth points to China's glass industry, especially the development of ultra-white glass, ultra-thin glass, photovoltaic glass and energy-saving glass, as well as innovations in liquid crystal displays (LCDs) and substrate.

### **OPPORTUNITIES AND CHALLENGES; TRANSFORMATION AND UPGRADING**

Facing opportunities and challenges, many glass companies are actively seeking transformation and upgrading, as well

as technological breakthroughs. China Glass, as a professional exhibition in the glass industry, always adheres to its philosophy of both being based on and serving the industry. It continuously explores, innovates, expands exhibition scope, enriches activities, improves service, helps enterprises seek new business opportunities and reach new corporations, and promotes industry transformation and upgrading. Organized by the Chinese Ceramic Society and contracted by Beijing Zhonggui Exhibition Co., Ltd., China Glass 2020 will take place at Shanghai New International Expo Centre 14-17 April 2020. With cultivation and development over the past 30 years, China Glass has become an international well-know exhibition with full independent intellectual property rights. It is the most commercially valuable exhibition in China's glass industry as well as the platform for innovation exhibition, technology exchange and business talks.

### **THE 2020 EVENT**

China Glass 2020 will be held at Shanghai New International Expo Centre (SNIEC), taking up seven indoor and three outdoor exhibition halls. Diverse technologies will be displayed and allocated among the 10 exhibition halls: E1 for international brands, E2 for glass pro-



duction, E3 for tempering furnaces and refractory materials, E4 – E7 for deep processing equipment and domestic glass, outdoor exhibition halls for raw and auxiliary materials. Total exhibition area will exceed 90,000 square meters. It is expected to attract approximately more than 900 top enterprises and more than 40,000 professional visitors in the glass industry. The popularity of China Glass and the difficulty of finding stands are the consensus of numerous enterprises. In this case, a large number of enterprises had submitted their applications for China Glass 2020 even before 30th China Glass exhibition would be over. We have already received many reservation applications since the stand sales started in July. To satisfy the great demand from many other small and medium size enterprises, the organizer managed to expand three new exhibition halls for extending more exhibition space. So far, there are over 400 domestic companies and 150 international companies have confirmed their participation at China Glass 2020.

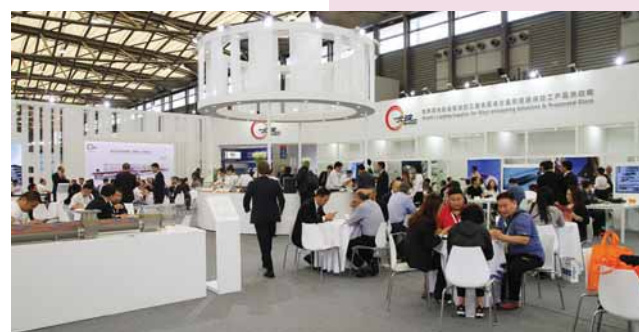
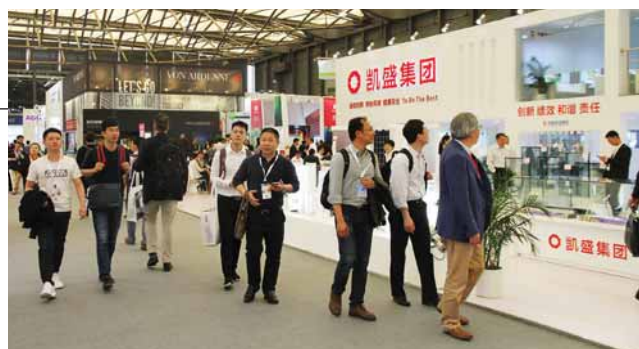
## DOMESTIC COMPANIES

Those domestic companies include: China Building Materials Academy, Triumph Group, Ruitai Materials Technology, Qinhuangdao Glass Industry Research & De-

sign Institute, China New Building Materials Design & Research Institute, Sinoma Advanced Materials, China Yaohua, Luoyang Float Glass Group, China Glass Holdings, TAIWANGGLASS, Xinyi Glass, CSG Holding, Jinjing Group, Shanghai SYP Glass, Kibing Group, Flat Glass Group, Shanxi Lihu, Hebei Yingxin, Shahe Glass Group, North Glass, Mountain Glass, Land Glass, South Glass Technology, Tenon(Beijing), Yinrui Intelligent Technology, Fangding Safety Glass, Beijing MGM Glass, EI Automation Equipment, GO-LIVE, Guangdong Fushan Glass, Beijing BOZA, Jinan Weili, Liaoning North Glass, Lewei Science & Technology, Tianjin Dinganda Glass, Guilin Champion Union, Dardi Water Cutter, Shandong Sanjin Glass, Mr. Glass, HIHO Glass, Shanxi Dahua Glass, Weifang Sanjiang Glass, Zibo GT Industrial Ceramics, ZIBO ASAHI, etc.

## INTERNATIONAL COMPANIES

International companies include: Lisec, Glaston, AGC, Vonardenne, Vesuvius, Sefpro, Dip-tech, Bentele, Henry F. Teichmann, Buhler Leybold, Grenzebach, Five Stein, Precision, Hegla, Zippe, Air Liquide, Bottero, Fenzi, Intermac, Ocmi, Carl Zeiss, Horn, Koemmerling, Technoform, Teka, Viprottron, Glasstech, Teco, Honeywell, etc.



China Glass 2020 has got the great support from many related organizations at home and abroad including: China Architectural and Building Glass Association, China Association for Glass Industry, Italian Trade Commission (ICE Italy), The Association of Italian Manufacturers and Suppliers of Machinery, Equipment and Special Products for Glass Processing (GIMAV), Germany Federal Ministry for Economic Affairs and Energy (BMWi) and the German Engineering Federation (VDMA). The

organizer will continue to cooperate with relevant industry organizations to set up German, Italian and American national pavilions in E1 hall.

## PROFESSIONAL MEDIA

In order to promote business communication and attract more professional buyers from all over the world, the organizer has established cooperation agreements with over 20 professional media in the glass industry, advertising across Europe, Middle East, South Asia and Latin America.



# Rollmac-Gemata



## TAKING GLASS PRINTING TO THE NEXT LEVEL

**A**t Vitrum, Glass-Technology International spoke to Mauro Pellizzari from Rollmac-Gemata about the new machine – on show at the event – a digital printer using six colours, which can also be expanded to use up to 12 colours to carry out particular hues and specific RAL colours.

**Glass-Technology International (GTI):** Tell us something about this new machine on show here at Vitrum.

### ALL KINDS OF PRINTING – WITH UP TO 12 COLOURS

**Mauro Pellizzari, Rollmac:** The machine here at our stand at Vitrum enables to

print any type of photo or painting on glass thanks to its use of 6-12 colours. In terms of industrial applications, this means printing marble or wood designs on glass, also using metallic paints.

**(GTI):** In your opinion, could this type of printing take the place of satin- and

acid-etched glass?

**Rollmac:** It all depends on the type of end product that you need but of course this is possible! Not for a single-colour satin-etched sheet of glass because it would be better to use a roller printer.

If, on the other hand, the end product involves a decorative item on the glass it

During the recent edition of Vitrum, Glass-Technology International spoke to Rollmac-Gemata about its most recent development in the glass printing sector. With glass sizes becoming bigger and bigger, and requests for digital printing more and more complex, the company has come up with a machine able to satisfy all these needs.

## INDUSTRIAL APPLICATIONS

**Rollmac:** Of course! But this is more of a niche sector, because a machine like this is used more for industrial applications.

There is also the possibility of adding other colours to increase the variability of the designs, such as gold, silver and platinum metallic paints, anti-drip paints. This means that when you need to print a floor surface, instead of applying a chemical-type coating that will be subject to wear over time, the required design can be printed.

The possibility to add specific colours means that you literally have no limits to the end results you want to achieve.

would be better to use digital printers, especially if we are speaking about large areas. Just think about sheets of glass with shaded colour application, or the printing of marble designs, where the different panes need to be connected to each other to form wall areas, following the design.

Another possibility is that of glass used in home appliances – ovens and refrigerators, or cook-tops, for

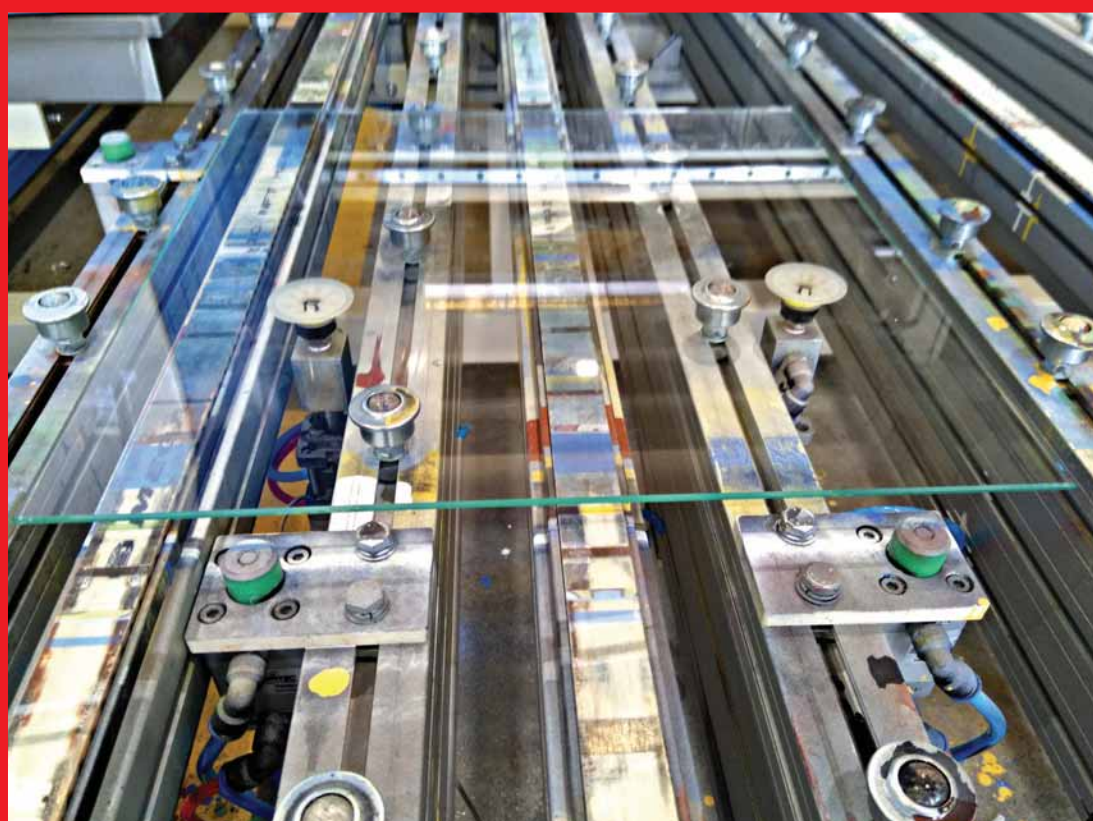
example.

But the main characteristics of this type of digital printing are the quality and resolution of the printing that can be obtained with this machine, along with flexibility with regards to the endless possibilities of printing.

**(GTI):** What about photos? Are we also speaking about personal photos – of family and friends for example?







This also has effects on the efficiency of the work being carried out, such as when printing an area of about 1,000 square metres in a single colour.

### **PRACTICAL ASPECTS: OPERATORS, GLASS SIZES, AND SPEED**

**(GTI):** Let's look at the practical aspects of the machine – how many operators are required to operate this printer?

**Rollmac:** A single operator can manage this machine with ease. Once the printing information has been input, the machine carried out printing while the operator can start to prepare the next piece of glass to

be printed.

**(GTI):** What sizes of glass can the machine print?

**Rollmac:** Glass size obviously depends on the size of the machine. The largest machine that we build is 3.600 x 6 metres – used for shop windows – where the same shop may also want to have its logo on the glass.

We (often) work and build our machines as per the feedback and requests we receive from glassworks, also and especially with regards to the combinations of colours that the machines uses to print. This means that starting from the 6-printing-heads format, we can reach up

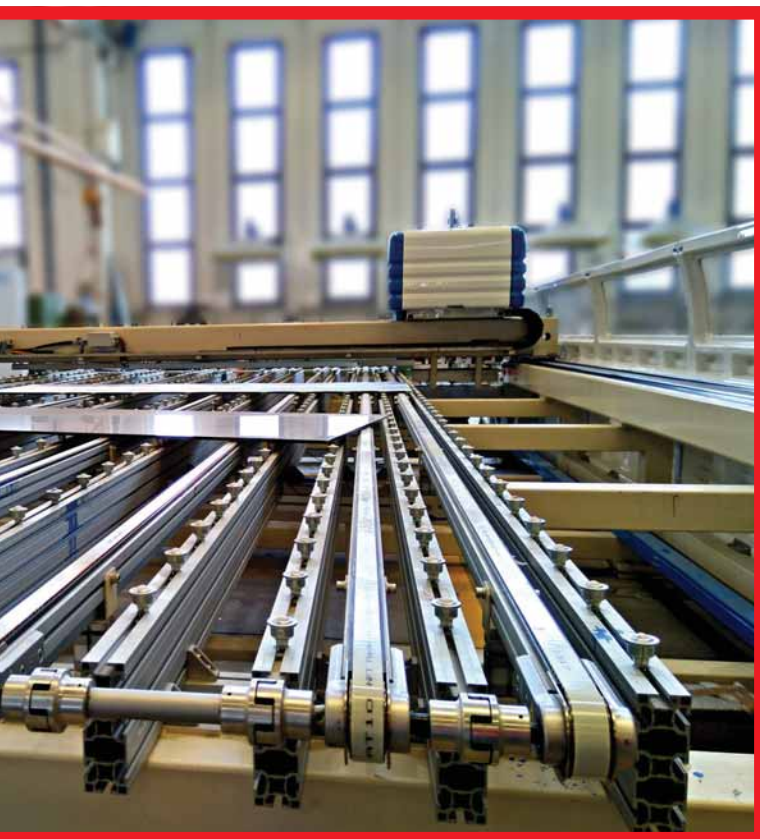
to 12 heads in line, or also a combination of 6+6, reaching higher printing speeds.

**(GTI):** Tell us a little more about speed ...

**Rollmac:** The printing speed of the machine depends on







a series of factors. For example, a machine with six printing heads, printing a highly-detailed design,

prints one square metre in 8 minutes. The more detailed and high-resolution the design to be printed,

the less speed the machine has. If we are printing a shaded-colour area, on the other hand, the speed can be much higher. All this is due to the size of the drops of colour that 'fall' onto the glass, and we want those drops to create a shaded effect or a highly-detailed and very small design. We are speaking about drops of picolitres – which are a trillionth part of a litre.

### OFFERING A COMPLETE OFFER OF MACHINERY

**(GTI):** What do you offer glassworks as far as machinery is concerned?

**Rollmac:** Glassworks right now need to have a truly complete offer with regards to machinery and equipment. This aspect is important to be able to cover all the needs and demands of glassmakers, who, in turn, need to respond to market needs – and more im-

portantly – to the requests coming from architects for incredibly large areas of glass printed digitally. And this is where we come into the picture, with our machines that can handle both large areas and the smallest, highly detailed decorations.



Rollmac - GEMATA SpA

**Rollmac**

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[www.rollmac.it](http://www.rollmac.it)







# Turomas

## POSITIVE RESULTS AT VITRUM 2019

**A**t the 2019 edition of Vitrum, the Turomas team was made up of Antonio Ortega, CEO; Álvaro Doñate, Business Director of Spain and Portugal; Guillermo Ortega, Business Director of South America and CCA; Jordi Fortuny, Business Director of North America

and Oriol Llorens, Business Director of Europe. Visitors who approached the stand had the opportunity to learn further details about the complete range of standardized machinery for monolithic glass, laminated glass or smart storage, as well as the advanced individualized solutions that

Turomas offers.

The majority of the visits came from European and American countries, although there was also African, Asian and even oceanic representation. Most of them showed great interest in expanding information on the features and models from Turomas smart storage.

The sales team is satisfied with the attendance and reception at the fair.

In addition to current and potential buyers, the stand served as a meeting point and contact opportunity with potential new distributors to market the company's machines in other countries.

### **ALUVACSA AND TUROMAS STRENGTHEN THEIR RELATIONSHIP AT VITRUM 2019**

The participation of the Spanish company in the international exhibition was both gratifying and

Tuomas team at Vitrum, from left:  
Oriol Llores, Antonio Ortega, Jordi Fortuny,  
Guillermo Ortega and Álvaro Doñate



Vitrum, the international fair specialized in machinery, equipment and plants to process flat and hollow glass was held 1-4 October in Milan, northern Italy. Tuomas was, once again, present at the event with its complete range of standardized machinery for monolithic- and laminated glass, as well as intelligent storage and — of course — Industry 4.0 solutions.

A solid project in South America and two possible business operations for Europe, specifically for Croatia and Ukraine, are expected to be confirmed later this year.

### **TUOMAS BRINGS ITS 4.0 SOLUTIONS TO MILAN**

helpful. In addition to informing on progress, innovations and trends and strengthening the brand image, business contacts were also reinforced, such as the relationship between Tuomas and Mexican company Aluvacs. The Mexican company, in fact, aims at expanding its productive capacity and is, once again, relying on Tuomas for its new growth plan.

As a matter of fact, the sale of a smart storage model SR-07, a loader model LR-07 and a table for cutting monolithic glass model 516C was signed during the show.

Digital infrastructures, interconnections and automated production systems, which are driving competitiveness today, also received a special highlight during the four days of Vitrum 2019.

2020 will be the year of automation and TUOMAS will not be less. New innovations required by industry 4.0 to gain in productivity and competitiveness have been developed to be fully integrated in its storage system and cutting process. Simplification, speed and effectiveness are the benefits of this research. 2020 will be the year of the

official launch of this solution, as well as other innovations requested by Industry 4.0 to grow productivity and competitiveness.

**Tuomas**

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# 2019

20 - 21 NOVEMBER 2019  
BOGOTÁ - COLOMBIA

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• MANUFACTURING • PROCESSING • PRODUCTS • SERVICES



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Second Edition

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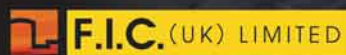
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\* Represented company

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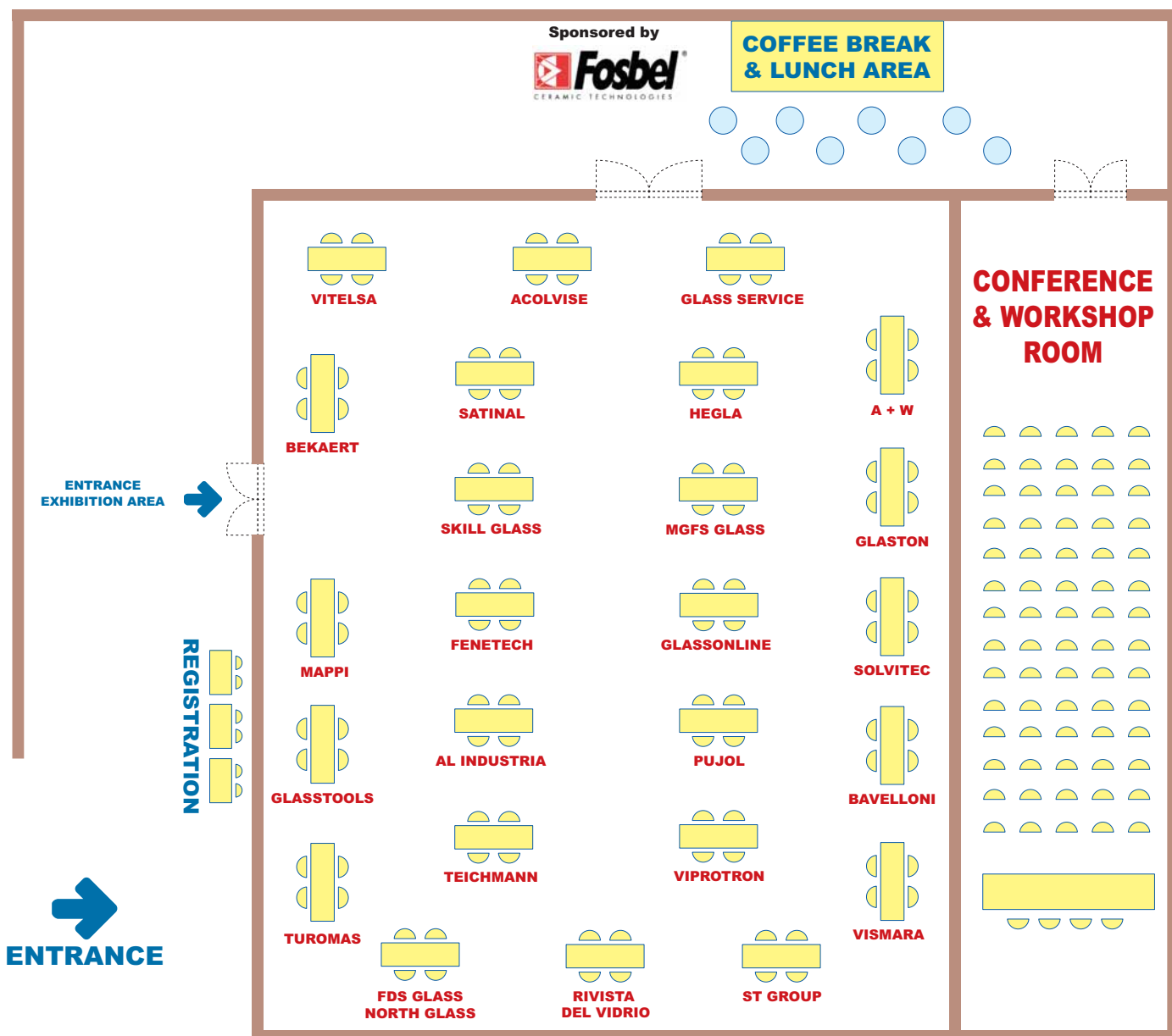


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## 20<sup>th</sup> November 2019

14:30 - 14:45

### WELCOMING ADDRESS

**CAMACOL** – Daniel Rey

14:50 - 15:05

### HOT & COLD REPAIR DEVELOPMENTS AND APPLICATIONS FOR GLASS MELTING FURNACES

**Fosbel** – Cristina Sanchez

Since the inception of the new ceramic welding technology, Fosbel has continued to develop useful solutions for glassmakers to extend furnace life while the furnace remains hot so that production losses are minimized while accomplishing the repair as well as optimizing cold repair times. This presentation will focus on advances made in materials and innovative solutions developed for repairing glass melter bottoms, cleaning regenerator checker packs, and the installation of monolithic structures to renew arches at port crowns, regenerator crowns, and introduction to RapidbuildTM, an innovation in construction allowing glassmakers a quicker return to production.

15:10 - 15:25

### NEW TUROMAS DELEGATION IN BOGOTÁ

**Turomas** – Antonio Ortega, Juan David Dávila

TUROMAS will expand its presence in Latin America with the opening of a new delegation in Bogotá that will be officially presented at Colombia Glass 2019. In the Colombian capital, TUROMAS will have its own sales team and qualified technicians to offer a better service. In addition to being able to purchase all types of spare parts and consumables, the customer will also have an immediate response to their needs for the assembly or repair of machinery.

15:30 - 15:45

### ENABLING QUALITATIVE HOT GLASS BENDING AND FORMING WITH BEKAERT HEAT RESISTANT CONTACT MATERIALS

**Bekaert** – Johan Palmers

To allow scratch free and defect free bending and forming of automotive, ballistic, container and architectural glass the tools and conveyors need to be equipped with soft and resilient materials. These contact materials need to be heat resistant to temperatures of 650-700°C, to show an acceptable lifetime and ease of use. Bekaert is your partner in development and supply of the correct solution in either tempering as lamination processes. Starting from a stainless steel fiber, thinner than a human hair, different textile type of products (knit, weave, tape, felt) are produced. We will gladly introduce you to our hot glass contact materials, their use and capabilities.

15:50 - 16:10 **COFFEE BREAK** SPONSORED BY FOSBEL

16:15 - 16:30

### INDUSTRY 4.0 - WHAT IS THE FOURTH INDUSTRIAL REVOLUTION?

**Glaston** – Moreno Magon

How much it will impact the glass industry? Why did the G7 invest \$ 100 million to study the impact of smart machines on the global market? In today's world, a company's competitiveness lies in the agility of its decisions and, for agility, it is necessary to obtain updated information in real time. Only in this way can the company remain competitive by focusing on the efficiency and services excellence. Why should glass be left out of the fourth industrial revolution? What can change in our glass industries in the coming years? The presentation aims to address the technological changes that will improve the efficiency, quality and agility in the transformation of tempered and laminated glass. Are you ready for this revolution?

16:35 - 16:50

### A+W SOFTWARE, GET YOUR FACTORY TO THE NEXT LEVEL

**A+W Software** – José Palacios

How to obtain greater benefits and be more productive. Internet and plant sales, statistics, production control, optimization improvements and more.

16:55 - 17:10

### MODEL PREDICTIVE CONTROL (MPC) IN GLASS FURNACES IS BECOMING A STANDARD CONTROL TOOL

**Glass Service** – Gabriel Noboa

In this paper we want to explain what MPC means for glass furnaces and how Glass Service with its Expert System software can help Glass companies to use "smart operation" in their furnaces. We will present a series of cases and

examples of furnaces using Glass service software plus explanation what GS believe is the future in furnace control software.

17:15 - 17:30

### IF I HAVE A TEMPERING FURNACE OR AUTOMATIC MACHINERY, WHAT KIND OF SOFTWARE SOLUTION SHOULD I HAVE

**FeneTech** – Alexander Ochoa

The majority of glass manufacturing facilities invest a lot of money on expensive equipment and very little or sometimes nothing on software to control and to operate efficiently that machines or expensive equipment, in the case of a tempering furnace could cost more than 500,000.00 USD. This is like having a very strong body, strong arms and legs (Cutting Table, edging machines), strong chest and abs (Tempering furnace, Lamination line), but a very small brain or none (excel, inhouse, or modular old systems 40 years old). In the following presentation I will show you what should your current software solution do to maximize your current investments in machinery, why you should not by an old modular solution and what type of company you should look for to be your software partner.

## 21<sup>th</sup> November 2019

10:00 - 10:30 **WELCOME COFFEE** SPONSORED BY FOSBEL

10:30 - 10:45

### PUJOL, SINCE 1911 NO LIMITS IN GLASS CREATION

**Hornos Pujol** – Julian Martin

Hornos Pujol, is a fourth-generation company founded in 1911, consolidated worldwide in more than 90 countries as a company specialized in the sector of laminated glass and offering a complete 360° service based of ovens and complete rolling solutions, consumables, training & Technical Assistance Service. We have own factories of Machinery and Complete Equipment of Laminated and of extrusion of EVA film. Our team is formed by 70 professionals who are full dedicated to serving the client's needs. During Colombia Glass Pujol will present its extensive range of industrial ovens for glass lamination in addition to the main features of the EVA film under its EVALAM brand and other special interlayer such as AB-AR, CIR or I-On by Pujol.

10:50 - 11:05

### COMPLETE SERVICE FROM THE RAW MATERIAL DISCHARGE TO THE ENDING AT THE GOB

**M Glass Factory Services** – Hans Mehl

M-Glass Factory Services was established in Mexico in 2011. We are dedicated to offer services to the Glass industry; we are one of the few companies who, together with their represented companies, can cover services starting from the raw material discharge and ending at the gob. We can count on technological tools and highly experienced and trained human resources, with more than 30 years of experience. This guarantees an excellent service, quality and confidence which we put at the disposal of our clients during any new construction, repair or maintenance of Glass melting furnaces or Batch plants, among others. Through our represented companies, we offer materials and equipment such as Refractory material, Batch plants, Thermocouples, combustion systems and measuring and control equipment. We also offer Heat-Up and draining of furnaces.

11:10 - 11:25

### BAVELLONI SPA COMPANY PRESENTATION AND PRODUCT PORTFOLIO

**Bavelloni** – Angelo Leidi

Bavelloni, historical brand in the flat glass industry, has a very long tradition, being in the field for over 70 years. The Company manufactures its full range of products for flat glass processing in Italy and has been able to grow over the years and widen its offering. The product portfolio now includes: CNC working centers, solutions for cutting, edging, bevelling, drilling & milling - available as stand-alone machines as well as in customized integrated lines, quality diamond and polishing tools manufactured by Bavelloni Tools and high end solutions for flat glass washing and drying produced by Yalos Bavelloni. Bavelloni SpA has constantly supported innovation and has always focused on assisting its customers developing effective solutions and long-lasting collaborations. The experience acquired through thousands of machinery designed and manufactured in Italy and installed worldwide, is a guarantee of unmatched reliability and quality.

11:30 - 11:45

### VERTICAL CNC CENTER: THE VERTICAL SOLUTION OF SKILL GLASS

**Skill Glass** – Jacky Adrianzen

Over the years the company has specialised in "vertical" high technology, a characteristic that allows glassworks to optimise handling and the use of

space, especially when using large sheets of glass as is common today. The vertical processing of sheet glass has many advantages in comparison with flat processing. The size of the machine is considerably less than a corresponding flat machine and the position of the sheet glass on the roller automatically obtains the fixed zero point without error to the extent that the stroke is certain. Furthermore, horizontal machines must be perfectly even to avoid breaking the glass whereas with vertical machines, the position of the glass is naturally aligned since it is supported from underneath.

**11:50 - 12:05**

## SUCCESSFUL OVERALL QUALITY CONTROL IN ARCHITECTURAL GLASS PROCESSING

**Viprotron – Rainer Feuster**

Since 2004 Viprotron is producing scanners for defect detection in the architectural glass processing. It covers all production stages from cutting, grinding, tempering, laminating and insulating glass. Even fire protection glasses or mirrors and spandrels can be controlled.

In cutting the Jumbo Controller detects the bigger defects in unwashed glass. So you do not process glass, which obviously will lead to a claim. During the process the Quality Scanner 3D will check after a washer the single glasses on a high performance level, before they are processed to laminated or insulated glasses. The same our ECO Scanner does on a standard level. After tempering our Anisotropy Scanner shows iridescences and haze in the glass and provides data for improving the tempering quality level. At the end our Quality Checker controls the final product quality for IGUs (spacers and grids) and safety glasses (contour and cutouts / drills).

**12:10 - 12:25**

## HEGLA PRESENTS SOLUTIONS FOR THE PRESENT AND FUTURE OF GLASS PROCESSING

**Hegla – Rolf Meyer**

The HEGLA Group, HEGLA TaiFin, HEGLA-HANIC and HEGLA boraident will be

exhibiting jointly under the motto "Shaping the future and providing impulses for the present".

- HEGLA
  - space-saving storage and provisioning solutions for glass
  - loading solutions for all requirements
  - automatic shuttle-storage – a shuttle storage system that meets the highest standards
  - high performance for float glass cutting and breaking lines
  - high performance for laminated glass cutting lines
  - combined cutting solutions for float glass and laminated glass (incl. shapes)
  - residual glass handling that sets standards
  - sortjet for online/offline production
- HEGLA TaiFin: advanced glass furnaces
- HEGLA HANIC: robust software solutions
- HEGLA Boraident: Upgrading Glass Products with solutions for Laser marking on glass, Laser structuring, edge deletion and decoating of glass.

**12:30 - 12:45**

## AL INDÚSTRIA - POLYMER AND GLASS. INNOVATIONS

**AL Indústria – Max del Olmo and Carlos Eduardo Pires**

15 years ago, when AL began its project to produce toughened glass accessories, the proposal was to present the alternative to brass, stainless steel and zamak hardware that would facilitate the installation of the glassmaker and present a better cost / benefit ratio. As founder, Mr. Max Del Olmo, was aware of the versatility and application of the polymer, based on the radical change that the polymer brought to civil construction. The production of the first polymer hardware in Brazil began in 2004/2005. After 15 years of hard work and technological development, AL Indústria has been maintaining the leadership in the Brazilian and South American markets in the manufacture of hardened glass hardware for about 10 years, with almost 20 million pieces produced annually. Meanwhile, AL, in response to the request of its distributors, acquired a modern 6-inch extruder, starting the production of aluminum profiles for the installation of doors, windows and screens, consolidating its position as the largest glass tempering accessories company of Brazil (South America). AL Indústria employs approximately 370 direct and 120 indirect employees, occupying the total covered area of approximately 15,000 m<sup>2</sup> on 3 plants.

# Programa de congreso y talleres

**20 de noviembre de 2019**

**14:30 - 14:45**

## DISCURSO DE BIENVENIDA

**CAMACOL – Daniel Rey**

**14:50 - 15:05**

## DESARROLLOS EN REPARACIONES EN CALIENTE Y FRÍO PARA HORNO DE FUSIÓN DE VIDRIO

**Fosbel – Cristina Sanchez**

Desde la creación de la nueva tecnología con soldadura cerámica, Fosbel ha continuado desarrollando soluciones de reparación en caliente para extender la vida útil del horno mientras el horno permanece en operación, minimizando las pérdidas en producción durante la reparación, así como soluciones para optimizar el tiempo de reparaciones en frío. Esta presentación se enfocará en los avances tecnológicos en materiales, soluciones innovadoras para la reparación en caliente del piso del horno, limpieza de canastas y la instalación de estructuras monolíticas para renovar los arcos de puertas, coronas de regeneradores, así como una introducción a RapidbuildTM, innovación en construcción en frío que permite retornar a producción en menor tiempo.

**15:10 - 15:25**

## NUEVA DELEGACIÓN DE TUOMAS EN BOGOTÁ

**Tuomas – Antonio Ortega, Juan David Dávila**

TUOMAS ampliará su presencia en Latinoamérica con la apertura de una nueva delegación en Bogotá que se presentará oficialmente en Colombia Glass 2019. En la capital colombiana, TUOMAS contará con un equipo comercial y técnicos cualificados propios para ofrecer un mejor servicio. Además de poder adquirir todo tipo de repuestos y consumibles, el cliente también tendrá respuesta in situ a sus necesidades de montaje o reparación de maquinaria.

**15:30 - 15:45**

## CONSIGUE VIDRIO FORMADO Y CURVADO DE ALTA CALIDAD CON MATERIALES DE CONTACTO DE ALTA RESISTENCIA AL CALOR DE BEKAERT

**Bekaert – Johan Palmers**

Para permitir el curvado y la formación sin rayones de vidrio automotriz, arquitectónico, balístico y de contenedores, los herramientas y

transportadoras deben de estar equipadas con materiales blandos y resistentes al calor. Estos materiales de contacto deben de ser resistentes al calor en temperaturas de 650 – 700°C, para mostrar una vida útil aceptable y facilidad de uso. Bekaert es tu socio en desarrollo y suministro de la solución correcta, tanto en procesos de templado como de laminación. Partimos de una fibra de acero inoxidable, más delgada que un cabello humano, con lo que fabricamos diferentes tipos de textiles (telas, cintas, felpas, cuerdas). Con mucho gusto le presentaremos nuestros materiales de alta resistencia al calor en contacto con el vidrio, sus usos y capacidades.

**15:50 - 16:10 RECESO**

**PATROCINADO POR FOSBEL**

**16:15 - 16:30**

## INDUSTRIA 4.0 - ¿CUÁL ES LA CUARTA REVOLUCIÓN INDUSTRIAL?

**Glaston – Moreno Magon**

¿Cuánto puede cambiar nuestro trabajo en la industria del vidrio? ¿Por qué el G7 invirtió \$ 100 millones para estudiar el impacto de las máquinas inteligentes en el mercado global? En el mundo actual, la competitividad de una empresa radica en la agilidad de sus decisiones y, para agilizar, es necesario obtener información actualizada en tiempo real. Solo de esta manera la empresa puede seguir siendo competitiva al enfocarse en la eficiencia y excelencia de sus servicios. ¿Por qué el vidrio debe quedar fuera de la cuarta revolución industrial? ¿Qué puede cambiar en nuestras industrias del vidrio en los próximos años? La presentación tiene como objetivo abordar los cambios tecnológicos que mejorarán la eficiencia, la calidad y la agilidad en la transformación del vidrio templado y laminado. ¿Estás listo para esta revolución?

**16:35 - 16:50**

## A+W SOFTWARE, LLEVA TU FÁBRICA AL SIGUIENTE NIVEL

**A+W Software – José Palacios**

Como obtener mayores beneficios y ser más productivo. Ventas por internet y planta, estadísticas, control de producción, mejora optimizaciones y más.

**16:55 - 17:10**

## EL CONTROL PREDICTIVO DEL MODELO (MPC) EN HORNO DE VIDRIO SE ESTÁ CONVIRTIENDO EN UNA HERRAMIENTA DE CONTROL ESTÁNDAR

**Glass Service – Gabriel Noboa**



En esta presentación queremos explicar lo que MPC significa para hornos de vidrio y cómo Glass Service con su software de sistema experto puede ayudar a las empresas de vidrio a utilizar "operación inteligente" en sus hornos. Presentaremos una serie de casos y ejemplos de hornos que utilizan el software de Glass Service, además de una explicación de lo que GS cree que es el futuro en el software de control de hornos

**17:15 - 17:30**

## SI TENGO UN HORNO DE TEMPLADO O MAQUINARIA AUTOMATICA QUE TIPO DE SOFTWARE DEBERIA DE TENER

**FeneTech – Alexander Ochoa**

La mayoría de las fabricas de proceso de vidrio invierten mucho dinero en equipos caros y muy poco o, a veces, nada en software para controlar y operar eficientemente esas máquinas o equipos caros, en el caso de un horno podría costar cerca de 500,000.00 USD o mas. Es como tener un cuerpo muy fuerte, brazos y piernas fuertes (mesa de corte, máquinas de bordes), cofres y abdominales fuertes (horno de templado, línea de laminación), pero un cerebro muy pequeño o ninguno (sistemas antiguos, internos o modulares de más de 30 años). En la siguiente presentación, le mostraré qué debería hacer su solución de software actual para maximizar sus inversiones actuales en maquinaria, por qué no debería comprar un viejo sistema modular y que tipo de empresa debería de buscar como tu socio comercial y proveedor de software.

**21 de noviembre de 2019**

**10:00 - 10:30 CAFÉ DE BIENVENIDA PATROCINADO POR FOSBEL**

**10:30 - 10:45**

## PUJOL, DESDE 1911 SIN LÍMITES EN LA CREACIÓN DE VIDRIO

**Hornos Pujol – Julian Martin**

Hornos Pujol, es una empresa de cuarta generación fundada en 1911, consolidada en todo el mundo en más de 90 países como una empresa especializada en el sector del vidrio laminado y que ofrece un servicio completo de 360° basado en hornos y soluciones completas de laminación, consumibles, capacitación y asistencia técnica. Servicio. Contamos con fábricas propias de Maquinaria y Equipo Completo de Laminado y de extrusión de película EVA. Nuestro equipo está formado por 70 profesionales totalmente dedicados a atender las necesidades del cliente. Durante Colombia Glass Pujol presentará su extensa gama de hornos industriales para la laminación de vidrio además de las principales características de la película de EVA bajo su marca EVALAM y otros interlayer especiales como AB-AR, CIR o I-On Glass.

**10:50 - 11:05**

## SERVICIO COMPLETO DESDE LA DESCARGA DE LA MATERIA PRIMA HASTA LA GOTA

**M Glass Factory Services – Hans Mehl**

M-Glass Factory Services se fundó en México en el 2011. Estamos dedicados a ofrecer servicios a la industria del vidrio; somos una de las pocas compañías que en conjunto con las empresas que representamos, podemos proporcionar un servicio completo desde la descarga de la materia prima hasta la gota. Contamos con las herramientas tecnológicas y humanas competentes, personal altamente especializado, con mas de 30 años de experiencia que aplicamos en favor de nuestros clientes para ofrecer un servicio de excelencia, calidad y confianza en la construcción, reparación y operación de hornos de fusión de vidrio, así como plantas para material y equipos diversos como material refractario para los hornos, plantas de materia prima, sensores de temperatura, sistemas de combustión y equipos de medición y regulación para los hornos, servicio de drenado y calentamiento de hornos.

**11:10 - 11:25**

## PRESENTACIÓN DE LA EMPRESA BAVELLONI SPA Y SU GAMA DE PRODUCTOS

**Bavelloni – Angelo Leidi**

Bavelloni, marca histórica en la industria del vidrio plano, cuenta con una larga tradición de más de 70 años en el sector. La empresa fabrica en Italia toda la gama de sus productos para el procesamiento del vidrio plano y ha podido crecer a lo largo de los años y ampliar su oferta. La gama ahora incluye: centros de trabajo CNC, soluciones para corte, canteado, biselado, taladrado y fresado - disponibles como máquinas autónomas y en líneas integradas personalizadas, herramientas de diamante y pulido de calidad fabricadas por Bavelloni Tools y soluciones de alta gama para el lavado y secado del vidrio producidas por Yalos Bavelloni. Bavelloni SpA ha apoyado constantemente la innovación y siempre se ha centrado en ayudar a sus clientes a desarrollar soluciones eficaces y colaboraciones duraderas. La

experiencia adquirida a través de miles de máquinas diseñadas y fabricadas en Italia e instaladas en todo el mundo, es una garantía de fiabilidad y calidad sin igual.

**11:30 - 11:45**

## CNC VERTICAL: SOLUCIÓN VERTICAL DE SKILL GLASS

**Skill Glass – Jacky Adrianzen**

La empresa ha sabido a lo largo de los años expresar el alta tecnología en "vertical", una característica que permite a la vidriería optimizar la utilización de los espacios y el desplazamiento sobre todo de las placas de vidrio de gran tamaño que tanto se utilizan hoy en día.

La elaboración de la placa en vertical tiene muchas ventajas respecto a la elaboración en plano: el espacio ocupado de la máquina es bastante menor respecto a una en plano; el apoyo de la placa en el grupo de rodillos correspondiente proporciona un cero automático fijo sin errores ya que el tope es seguro, además, mientras en las máquinas horizontales el plano tiene que ser perfecto, ya que de no ser así se puede romper la placa, la posición vertical está naturalmente alineada ya que el apoyo está en el borde inferior

**11:50 - 12:05**

## ÉXITO GENERAL DEL CONTROL DE CALIDAD EN EL PROCESAMIENTO DEL VIDRIO ARQUITECTÓNICO

**Viprotron – Rainer Feuster**

Desde el 2004 Viprotron fabrica escáneres para la detección de defectos en el procesamiento de vidrio arquitectónico. Cubre todas las etapas de la producción, desde el corte, el esmerilado, el templado, el laminado y el aislamiento. Se pueden controlar, incluso, los vidrios de protección contra incendios o los espejos y lunas de fachadas.

En el corte el Jumbo Controller detecta los defectos más grandes en vidrio no lavado. Así no se procesa el vidrio, lo que obviamente conduciría a una reclamación. Durante el procesamiento el Quality Scanner 3D comprueba de manera altamente eficaz las unidades de vidrio después de la lavadora antes de que sean procesadas para vidrios laminados o aislados. Nuestro ECO Scanner realiza lo mismo a un nivel más estándar. Después del templado, nuestro Anisotropy Scanner muestra las iridiscencias y la "niebla" en el vidrio y proporciona los datos para mejorar el nivel de calidad del templado. Finalmente nuestro Quality Checker controla la calidad del producto final, en el caso de las UVAs (los distanciadores y las rejillas) y en el caso del vidrio de seguridad (contorno y muescas/perforaciones).

**12:10 - 12:25**

## HEGLA PRESENTA SOLUCIONES PARA EL PRESENTE Y EL FUTURO DEL PROCESAMIENTO DEL VIDRIO

**Hegla – Rolf Meyer**

Bajo el lema «Modelar el futuro y dar un impulso al presente», el grupo HEGLA, HEGLA TaiFin, HEGLA-HANIC y HEGLA boraident se presentan juntos.

- HEGLA:
  - soluciones de almacenaje con ahorro de espacio
  - soluciones de carga para todos los requerimientos
  - almacén automático con shuttle que cumple con los requerimientos más exigentes.
  - alto rendimiento para líneas de corte de vidrio monolítico
  - líneas de corte de alto rendimiento para vidrio laminado (inc. formas)
  - soluciones de corte combinado para vidrio monolítico y laminado
  - corte de formas de vidrio laminado
  - gestión y manipulación de hojas restantes
  - clasificación para la producción en línea
- HEGLA TaiFin: hornos de templado avanzados
- HEGLA HANIC: soluciones de software sólidas
- HEGLA Boraident: soluciones para la marcación con láser y para estructurar o decapar vidrio con láser.

**12:30 - 12:45**

## AL INDÚSTRIA: POLÍMERO Y EL VIDRIO. SUS INNOVACIONES

**AL Indústria – Max del Olmo y Carlos Eduardo Pires**

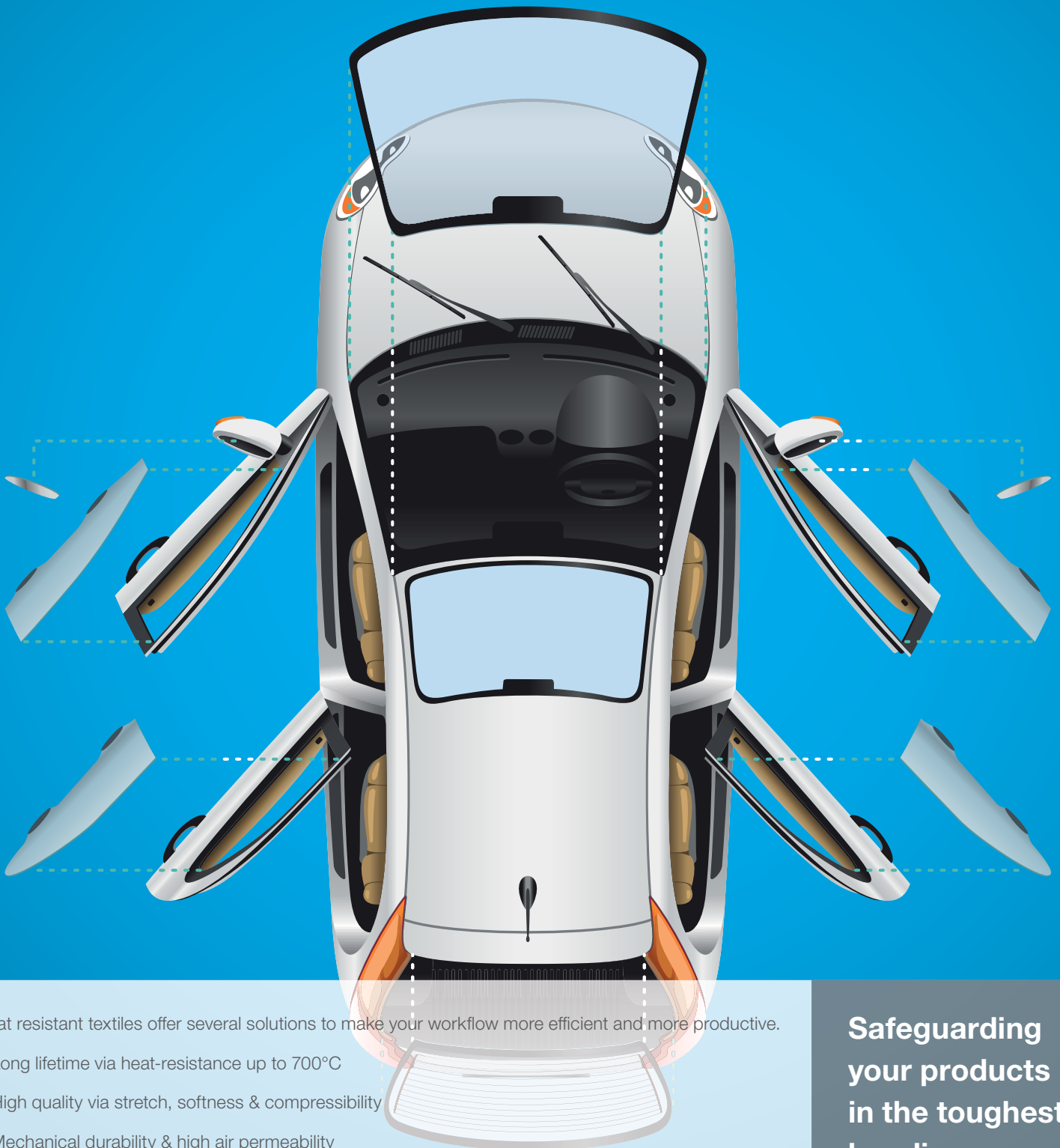
Hace 15 años, cuando AL comenzó su proyecto para producir accesorios de vidrio endurecido, la propuesta era presentar la alternativa al hardware de latón, acero inoxidable y zamak que facilitaría la instalación del vidrio y presentaría una mejor relación costo / beneficio. Como fundador, el Sr. Max Del Olmo, era muy consciente de la versatilidad y la aplicación del polímero, y se basó en el cambio radical que el polímero trajo a la construcción civil. La producción del primer hardware de polímero en Brasil comenzó en 2004/2005. Después de 15 años de arduo trabajo y desarrollo tecnológico, AL Indústria mantiene durante unos 10 años el liderazgo en los mercados brasileño y sudamericano en la fabricación de hardware de vidrio endurecido, con casi 20 millones de piezas producidas anualmente.

Mientras tanto, AL, en respuesta a la solicitud de sus distribuidores, adquirió una moderna extrusora de 6 pulgadas, comenzando la producción de perfiles de aluminio para la instalación de puertas, ventanas y mamparas, consolidando su posición como la mayor empresa de accesorios para vidrio templado de Brasil (América del Sur). AL Indústria emplea a aproximadamente 370 empleados directos y 120 indirectos, ocupando el área total cubierta de aproximadamente 15,000 m² en 3 plantas.

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## A+W Software

**A+W** is the software leader for the flat glass industry. We develop ERP, PPS and Optimizer systems for glass processing plants, making them more efficient and profitable.

Our solutions adapt to small, medium and large companies. We remain in constant renewal and innovation in new technologies for the glass industry, such as online sales and digitalization of templates through smartphone apps.

With clients worldwide and a great growth in Latin America, A+W has efficient connections with any type of machinery, which allows our clients to boost productivity. Our software can control from commercial processes to production control and delivery to the final customer.



**A+W** es el líder en software para la industria del vidrio plano. Desarrollamos sistemas ERP, PPS y Optimizadores para plantas procesadoras de vidrio, haciéndolos más eficientes y rentables.

Nuestras soluciones se adaptan a pequeñas, medianas y grandes empresas. Nos mantenemos en una constante renovación e innovación en nuevas tecnologías para la industria del vidrio, como venta online y digitalización de plantillas mediante apps para smartphone.

Con clientes en todo el mundo y un gran crecimiento en Latinoamérica, A+W tiene conexiones eficientes con cualquier tipo de maquinaria, lo que permite a nuestros clientes impulsar la productividad. Nuestro software puede controlar desde los procesos comerciales hasta el control de producción y entrega al cliente final.



## A+W Software

for Glass, Windows & Doors

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## AGC Ceramics

Represented by M Glass Factory Services



### AGC Ceramics Co., Ltd.

(also called "AGCC") is a recognized refractory manufacturer and one of the proven suppliers in the world that can provide complete furnace engineering services together with complete refractory and solutions. AGCC can propose an excellent furnace

concept in terms of energy-saving and eco-friendly with reasonable and economic refractory and engineering technologies. This combination of material technology and engineering knowledge places AGCC in a unique position in the glass industry. AGCC has been appointed, by many customers in the world, as one of the best partners in terms of single responsibility on furnace projects.

**AGC Ceramics Co., Ltd.** (también conocida como AGCC) es un fabricante reconocido de refractario y uno de los proveedores aprobados en el mundo el cual puede proveer la completa ingeniería de hornos junto con soluciones y refractarios. AGCC puede proponer conceptos de hornos en términos de ahorro de energía y ecológicos junto con tecnologías razonables de refractarios e ingeniería. La combinación de tecnología de materiales y conocimientos de ingeniería de hornos, pone a AGCC en una posición única en la industria del vidrio. AGCC ha sido nombrada, por varios fabricantes en el mundo, como uno de los mejores partners en términos de responsabilidad única en proyectos de hornos.



## AGC

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## AGIS Allied Glass Industry Services

We offer integral solutions starting from the raw material discharge and ending with the job for new constructions, repairs and maintenance. Project management, analysis, time schedules, lay-outs, engineering assistance for integration of process equipment, etc.

Basic, conceptual, mechanic and electric engineering. Mayor and minor repair management for glass melting furnaces. Furnace and forehearth construction. Construction of new batch plants.

All of these include structural calculations, mechanical and electrical engineering, automatization, time schedules, project budgets, studies of economic viability and detail engineering.



Soluciones integrales desde la recepción de las materias primas hasta la gota, en construcciones nuevas, reparaciones y mantenimientos. Gestión de proyectos, análisis, cronogramas, lay outs, asistencia de ingeniería para integración de equipos de proceso, etc. Ingeniería básica, conceptual, mecánica y eléctrica. Reparaciones menores y mayores de hornos de vidrio. Construcciones de hornos y alimentadores. Construcción de nuevas plantas de mezclas. Esto incluye cálculos estructurales, ingeniería mecánica y eléctrica, automatización, elaboración y seguimiento de cronogramas, presupuestos de proyectos, estudios de viabilidad económica, ingeniería de detalle.



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## AL Indústria

**AL Indústria** - Brand of quality and innovation. With the pioneering vision of its founder Max Leuxhe in 2003, AL is the first company to manufacture polymer hardware in the world. Today, installed in an industrial park of 15,000 square meters, it brings together the latest technology and offers a complete mix of products: handles, polymer fittings (8 mm. and 10 mm.), Extrusion and aluminum paint. Today we are recognized for the excellence of our products and services, as well as for our ability to innovate and be pioneers in the glass industry. This recognition, more than satisfaction and pride, motivates us to continue developing our activities in the best possible way, always creating the best solutions for the glass professional.



**AL Indústria** - Marca de calidad e innovación. Con la visión pionera de su fundador Max Leuxhe en 2003, AL es la primera empresa que fabrica herrajes de polímero en el mundo. Hoy, instalada en un parque industrial de 15,000 metros cuadrados, reúne la última tecnología y ofrece una mezcla completa de productos: manetas, herrajes de polímero (8 mm. y 10 mm.), extrusión y pintura de aluminio. Hoy somos reconocidos por la excelencia de nuestros productos y servicios, así como por nuestra capacidad de innovación y ser pioneros en la industria del vidrio. Este reconocimiento, más que satisfacción y orgullo, nos motiva a continuar desarrollando nuestras actividades de la mejor manera posible, creando siempre las mejores soluciones para el profesional del vidrio.



MARCA DA QUALIDADE

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## Bavelloni

**Bavelloni**, historical brand in the flat glass industry, has a very long tradition, being in the field for over 70 years. The wide product range is entirely made in Italy and includes CNC working centers, technologies for cutting, edging, bevelling, drilling & milling, available as stand-alone solutions and in integrated lines. Further to the acquisition of the tools business, the Company can also provide quality diamond and polishing tooling manufactured by Bavelloni Tools. Since June 2019 Bavelloni SpA is the majority shareholder of Yalos Bavelloni, a new company specialized in the production of high range horizontal and vertical washing machines for flat glass which integrate and complement the Company product portfolio.



**Bavelloni**, marca histórica en la industria del vidrio plano, cuenta con una larga tradición de más de 70 años en el sector. La amplia gama de productos de Bavelloni, fabricados íntegramente en Italia, incluye centros de trabajo CNC y tecnologías de corte, canteado, biselado, taladrado y fresado, disponibles como soluciones autónomas y en líneas integradas. Con la adquisición del negocio de herramientas, la empresa también puede ofrecer útiles de diamante y pulido de calidad, fabricados por Bavelloni Tools. Desde junio de 2019 Bavelloni SpA es el accionista mayoritario de Yalos Bavelloni, una nueva empresa especializada en la producción de lavadoras horizontales y verticales de alta gama para el vidrio plano que integran y complementan la oferta de productos de la empresa.

## BAVELLONI

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## Bekaert



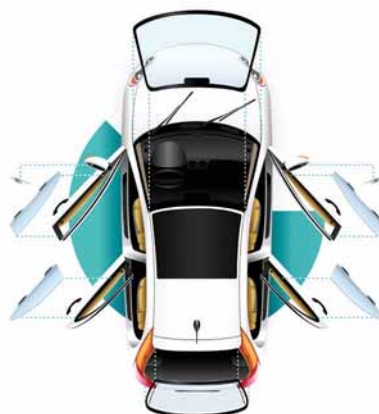
**Bekaert** offers a diverse and extensive portfolio of hot glass contact materials for the production of automotive windows, container & flat glass and ballistic glass. Our products include knitted and woven fabrics, tapes, felts, quenches, sleeves and ropes. Based on stainless steel fibers, our material feature outstanding resistance to heat, vibration and corrosion, even in non-automotive applications. Optimize your car glass bending process with our innovative, ironed quality heat resistant cloth.

**Bekaert** ofrece un diverso y extenso portafolio de materiales de contacto con vidrio caliente para la producción de vidrio automotriz, contenedores, vidrio plano y vidrio balístico. Nuestros productos incluyen telas, cintas, fieltros, mangas, cuerdas. Basado en nuestras fibras de acero inoxidable, nuestro material presenta una resistencia excepcional al calor, la vibración y la corrosión, incluso en aplicaciones no automotrices. Optimice su proceso de curvado de vidrio automotriz con nuestra innovadora tela de alta resistencia al calor.

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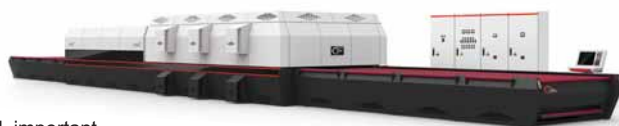
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## FDS Glass

### FDS Glass Corp.

is the exclusive representative in Latin America and the Caribbean for several important manufacturers for the flat glass industry. Covering mostly every process in the industry, FDS Glass Corp. offers top of the line glass tempering furnaces, cutting tables, automation lines, screen printing machines; PVB and EVA laminating lines; insulated glass lines; washing, drilling, edging, beveling machines; loading and storage systems; vertical CNC's, waterjets; quality control scanners; water treatment; specialized software; and a wide range of hardware, supplies and parts (North Glass, Handong Glass, Humam, Hiseng, Lijiang, Deltamax Automazione, Denver, Zafferani, A+W).



**FDS Glass Corp.** es representante exclusivo en Latinoamérica y el Caribe de importantes fabricantes de maquinaria e insumos para la industria del vidrio plano. Cubriendo casi todos los procesos en vidrio plano, ofrece hornos de templado, mesas de corte, sistemas de automatización, serigrafía; líneas de laminado con PVB y EVA; líneas para doble vidrio; lavadoras, taladros, pulidoras, biseladoras, bilaterales; cargadoras, sistemas de almacenamiento: CNC's Verticales, WaterJets; escáneres de control de calidad; tratamiento de agua; software especializado; y una amplia gama de herrajes, insumos y partes (North Glass, Handong Glass, Humam, Hiseng, Deltamax Automazione, Denver, Zafferani, A+W).



### FDS Glass Corporation

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## Fosbel



**Fosbel** is a world leader in furnace refractory maintenance services. For over 30 years, we have developed and implemented innovative technologies that extend furnace life and increase productivity in a wide range of industries. Fosbel's industry experts partner with plant management & furnace operators to engineer a total maintenance solution that optimizes production, reduces maintenance & energy costs, and reduces emissions. We provide a wide range of innovative furnace maintenance services such as ceramic welding, furnace rebricking, rebuilding, in situ inspections, condition monitoring, high emissivity ceramic coatings, consulting and a variety of hot repair & refractory maintenance technologies.

**Fosbel** es líder mundial en servicios de mantenimiento refractario para hornos. Durante más de 30 años, hemos desarrollado e implementado tecnologías innovadoras que extienden la vida útil del horno y aumentan la productividad en una amplia gama de industrias. Nuestros expertos trabajan en conjunto con Ingeniería y la Planta para diseñar una solución de mantenimiento total que optimice la producción, reduzca el mantenimiento, costos energéticos y emisiones de los hornos. Brindamos una amplia gama de servicios innovadores de mantenimiento de hornos, como soldadura de cerámica, reparaciones en caliente de hornos, reconstrucción, inspecciones in situ, monitoreo de condición, consultoría y una variedad de tecnologías para reparaciones en caliente y mantenimiento de refractarios.



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## Glass Service GS



**GLASS SERVICE** is a leading global consultant for glass melting/conditioning, INDUSTRY 4.0 furnace control, operation, troubleshooting, and furnace design. The company's portfolio also includes glass furnaces combustion equipment (FlammaTec) and design and manufacture of electric glass melting systems (FIC). Mathematical modeling GFM software (design optimization) and Expert System ESIII™ (automated furnace and forehearth control) provide cost savings and ease of operation. The high-resolution infrared/

visual A-SENS camera, paired with ESIII™, allows furnace operators to tap into Industry 4.0 standards. GS labs analyze 2000+ defects yearly, and offer melt testing utilizing basic and applied research.

Headquartered in Czech Republic with offices in Netherlands, USA, Japan, China and Russia.

**GLASS SERVICE** es un líder y consultor mundial para la industria de vidrio en las áreas técnicas de fundición, condicionamiento, control de la operación del horno, laboratorio y modelo para diseños de hornos. También incluye entre sus portafolios para hornos de vidrio equipos de combustión (FlammaTec) y ayuda eléctrica para hornos (FIC). El software de los Modelos matemáticos (GFM) ayudan a optimizar los diseños de los hornos y los sistemas de control expertos (ESIII™) ayudan a optimizar la operación de hornos. Las combinaciones de estas tecnologías ayudan a nuestros clientes ahorrar energía y simplificar operación.

La cámara A-SENS infrarroja/visual de alta resolución, combinada con sistema de control ESIII™, permite a los operadores de hornos aprovechar los estándares de la Industria 4.0. Los laboratorios de GS analizan e interpretan resultados de más de 2000 defectos cada año provenientes de todo tipo de horno y tipos de vidrios. Estos reportes ayudan a nuestros clientes resolver el posible problema más rápido. El corporativo de GS se encuentra en la República Checa con oficinas en Holanda, USA, Japón, China y Rusia.



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## Glasstools de Colombia

For 22 years **Glasstools** has been a leading sales agent for the glass processing industry, grinding wheels, drill bits, diamond tools, cerium oxide and various tools, always with the highest quality, turning our customers' needs into ours, offering confidence, originality, and guarantee. By taking part in Colombia Glass Glasstools will represent Toyo, Bohle, RBM and other important worldwide brands.



Hace 22 años **Glasstools** es una empresa líder en la comercialización de productos para la industria transformadora de vidrio, muelas, brocas, útiles diamantados, óxido de cerio y herramientas diversas, siempre con la más alta calidad, convirtiendo las necesidades de nuestros clientes en la nuestra, ofreciendo confianza, originalidad, y garantía. En Colombia Glass Glasstools representará Toyo, Bohle, RBM y otras marcas reconocidas de calidad y de proyección mundial.

**Glasstools**

HERRAMIENTAS PARA EL TRABAJO DEL VIDRIO

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## Glaston Brasil

Our mission is to make your glass outstanding. By providing you with machinery, technology and expertise so you can truly stand out. We are committed to help you achieve success in your chosen



area of glass processing. We're passionate about innovating the next level in world-class technology, dedicated services and technical support so you get the highest production energy efficiency and best end glass quality. We offer you our expertise to inspire potential and open up exciting opportunities in glass. In all we do, we aim at giving you the best customer experience possible. This guarantees a clear and visible difference – and enables you to reach profitable business results.

Nuestra misión es hacer que su vidrio sea excepcional. Proporcionándole la maquinaria, tecnología y experiencia para que realmente pueda destacar. Nos comprometemos a ayudarle a lograr el éxito en su área de procesamiento de vidrio elegida. Nos apasiona innovar al siguiente nivel en tecnología de calidad, servicios especializados y soporte técnico, para que obtenga la mayor eficiencia energética en la producción y la mejor calidad del vidrio final. Le ofrecemos nuestra experiencia para inspirar su potencial y abrir emocionantes oportunidades en el vidrio. En todo lo que hacemos, nuestro objetivo es ofrecerle la mejor experiencia posible como cliente. Ello garantiza una diferencia clara y visible, y le permite alcanzar resultados empresariales rentables.



**glaston**  
seeing it through

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## HEAT-UP Latin America



A proud, mexican company, which merged the Swiss quality and German reliability. Some of our services:

- furnace heat-up, cooling down and draining;
- reconstruction and thermal cleaning of bloqued regenerators;
- drilling;
- bubbler systems incl. installation;
- expansion control during heat up or cooling down;
- controled cooling down;
- heat hold during hot repairs of regenerators using oxygen burners in order to minimize loss of production;
- heat hold (1100°C) during any other hot repair of a furnace.

Empresa orgullosamente mexicana que conjuntó la calidad Suiza y la confiabilidad Alemana.

Entre nuestros servicios:

- calentamiento / enfriamiento y drenado de hornos;
- reconstrucción y limpieza de regeneradores bloqueados;
- servicio de barrenado;
- suministro de sistemas de burbujeadores incluida instalación;
- control de la expansión (tornillería) del horno durante enfriamiento y calentamiento;
- enfriamiento controlado durante el apagado del horno;
- calentamiento por medio de quemadores de oxígeno durante reparaciones en caliente de regeneradores para evitar pérdidas de producción;
- mantener temperatura (1,100°C) durante reparaciones en caliente del horno.

**HEAT UP** LATIN AMERICA  
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## Hegla

With over 42 years of experience the **HEGLA Group** provides forward-looking system solutions for the cutting and processing of flat, automotive and functional glass. We aim to provide comprehensive, expert and personal support and always produce the best solution to suit the customer's needs. Our Customers include most major Flat Glass Producers, Coating Fabricators, Architectural Glass, Automotive Glass, Fenestration Industry, Glass Wholesalers and Glaziers. More than a manufacturer alone, we see our main role as a service provider. With our subsidiaries HEGLA boraident, HEGLA-HANIC and HEGLA-Taifin, we additionally offer know-how in the areas of laser technology, software for glass and powerful tempering furnaces.



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Con más de 42 años de experiencia, el **Grupo HEGLA** ofrece soluciones de sistemas con visión de futuro para el corte y el procesamiento de vidrio plano, automotriz y vidrios funcionales.

Nuestro objetivo es proporcionar un soporte integral, experto y personal y siempre producir la mejor solución para satisfacer las necesidades del cliente. Nuestros clientes incluyen a la mayoría de los principales fabricantes de vidrio plano, fabricantes de vidrio con capa, vidrio arquitectónico y automotriz, industria de ventanas, mayoristas de vidrio y cristaleros. Más que solo un fabricante, vemos nuestro papel principal como proveedor de servicios. Con nuestras filiales HEGLA boraident, HEGLA-HANIC y HEGLA-Taifin, también ofrecemos conocimientos en las áreas de la tecnología láser, software para vidrio y hornos de templado avanzados.

## Mappi International

Since 1993 **Mappi** has been designing and manufacturing glass tempering systems. Two locations, one in Italy and one in Florida (USA), are in charge of the construction and assistance of the 400 plants installed throughout the world. Each of these represents a response aimed at the needs of a specific customer. Currently the Mappi range is divided into two product lines: Fox and Ats. The Fox series offers compact furnace, with loading dimensions starting from 1050x2300 mm, while the Ats series reaches up to 3300x6000 mm. Mappi besides hardening furnaces also manufactures glass laminating machines.



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Desde 1993 **Mappi** ha estado diseñando y fabricando sistemas de templado de vidrio. Dos ubicaciones, una en Italia y otra en Florida (EE. UU.), son las responsables de la construcción y asistencia de las 400 plantas instaladas en todo el mundo. Cada una de estas representa una respuesta dirigida a las necesidades de un cliente específico. Actualmente, la gama Mappi se divide en dos líneas de productos: Fox y Ats. La serie Fox ofrece hornos compactos, con dimensiones de carga desde 1050x2300 mm, mientras que la serie Ats alcanza hasta 3300x6000 mm. Mappi, además de hornos de endurecimiento, también produce máquinas para laminado de vidrio.



## MGFS Glass Factory Services

A Mexican company established in 2011 offering services to the glass industry, counting on more than 37 years of experience in the industry with our CEO Hans Mehl. We are one of the few companies who, together with their represented companies, can offer a complete service from the raw material discharge up to the gob. We count with a highly specialized staff in order to offer the following services:

- coordination and supervision of furnace constructions (metal structure and refractory);
- supervision of cold or hot repairs;
- furnace heat-up;
- furnace audits, incl. endoscopy and thermography with reports;
- maintenance and construction of batch plants;
- other services.



Empresa mexicana dedicada desde el 2011 a ofrecer servicios para la industria del vidrio, cuenta con el liderazgo y experiencia a nivel mundial de más de 37 años de nuestro CEO Hans Mehl. Somos una de las pocas compañías que, en conjunto con las empresas que representamos, podemos proporcionar un servicio completo desde la descarga de la materia prima hasta la gota. Tenemos personal altamente especializado para brindar entre otros los siguientes servicios:

- coordinación y supervisión de construcciones de hornos (estructura metálica y refractario);
- supervisión de reparaciones en frío en caliente;
- calentamiento de hornos;
- auditorías de hornos, incluyendo endoscopias, termografías y reporte de estado;
- mantenimiento y construcción de plantas de mezclas;
- otros servicios.



**We deal with heat**

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## NorthGlass



**NorthGlass** was established on May 18th, 1995. It is a pioneer among Chinese enterprises developing and manufacturing glass deep-processing equipment, being the strongest & largest developer and manufacturer in its field.

Our major product, flat/bent glass tempering furnace, is ranked first of worldwide industry within last 14 years, according to production and sales volume. There are over 4000 NorthGlass tempering furnaces running in over 100 countries around the world, from which more than 120 of them are in Latin American countries such as Mexico, Brazil, Argentina, Chile, Colombia, Paraguay, Bolivia, etc.

**NorthGlass** se fundó el 18 de mayo de 1995. Es pionera entre las empresas chinas dedicadas al desarrollo y fabricación de maquinaria para el procesamiento especializado de vidrio y se posiciona como la empresa más grande e importante del sector en el país.

Siendo su principal producto los hornos de templado para vidrio plano y curvo, NorthGlass se posiciona como el principal productor mundial en los últimos 14 años en base a volúmenes de producción y ventas. Existen más de 4000 hornos funcionando en más de 100 países en el mundo, de los que más de 120 se encuentran en Latinoamérica en países como México, Brasil, Argentina, Chile, Colombia, Paraguay, Bolivia, etc.



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## Hornos Industriales Pujol



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**Hornos Pujol**, is a fourth-generation company founded in 1911, consolidated worldwide in more than 90 countries as a company specialized in the sector of laminated glass and offering a complete 360° service based of ovens and complete rolling solutions, consumables, training & Technical Assistance Service. We have own factories of Machinery and Complete Equipment of Laminate and of extrusion of EVA film. Our team is formed by 70 professionals who are full dedicated to serving the client's needs.

**Hornos Pujol**, es una empresa de cuarta generación fundada en 1911, consolidada en todo el mundo en más de 90 países como una empresa especializada en el sector del vidrio laminado y que ofrece un servicio completo de 360° basado en hornos y soluciones completas de laminación, consumibles, capacitación y servicio de asistencia técnica. Contamos con fábricas propias de Maquinaria y Equipo Completo de Laminado y de extrusión de película EVA. Nuestro equipo está formado por 70 profesionales totalmente dedicados a atender las necesidades del cliente.

## REFEL - Represented by M Glass Factory Services



**REFEL**, located in Italy, manufactures and sells high-quality fused cast AZS materials used in the melting tanks of the glass industry. It employs only premium raw materials, a high level of technology and sophisticated process controls to guarantee the constant high quality of each single block. REFEL supplies fused cast AZS for container, flat and special glass furnaces, and helps customers in defining long lasting and cost efficient furnace linings. With its modern laboratory, REFEL supports customers with a range of refractory (corrosion/blistering/exudation tests, post mortem analysis) and glass defect analyses, proposing solutions to customer problems based on a real root cause analysis.

**REFEL**, ubicada en Italia, fabrica y provee refractarios electrofundidos AZS de alta calidad utilizados en hornos de fusión del vidrio. El proceso solo usa materias primas premium, alta tecnología y sofisticados controles de proceso garantizando la alta calidad constante en el fabricado. REFEL provee electrofundido AZS a hornos para la industria del vidrio (envases/plano/especiales), ayudando también a definir los revestimientos para una mayor durabilidad y rentabilidad. Con su laboratorio moderno, REFEL realiza una gama de análisis del AZS como corrosión/formación de burbujas/exudación/análisis post mortem y análisis defecto vidrio, proponiendo soluciones al cliente basadas en análisis reales.



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## REVISTA DEL VIDRIO PLANO VIDRIOPERFIL.COM

Proporción 3, S.A. publishes and distributes the magazines:

- Revista del VIDRIO PLANO Edición AMÉRICA LATINA (Distributed in 21 countries: Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panamá, Paraguay, Perú, Uruguay, Venezuela, Brasil, Florida, Puerto Rico and Worldwide Manufacturers)
- Revista del VIDRIO PLANO Edición ESPAÑA y PORTUGAL
- QUIÉN es QUIÉN ESPAÑA, PORTUGAL and Worldwide Manufacturers
- HUECO ARQUITECTURA
- and the site...

VIDRIOPERFIL.COM, the glass, windows, doors and enclosures web (Spain, Portugal and 21 Latin America countries)

Proporción 3, S.A. edita y distribuye las siguientes publicaciones:

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- Revista del VIDRIO PLANO Edición ESPAÑA y PORTUGAL
- QUIÉN es QUIÉN ESPAÑA, PORTUGAL y Fabricantes Mundiales
- HUECO ARQUITECTURA
- y el portal...

VIDRIOPERFIL.COM, el portal del vidrio y la carpintería (España, Portugal y 21 países de América Latina)

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[www.vidrioperfil.com](http://www.vidrioperfil.com)



## Satinal Group - STRATO® - TK

The **Satinal Group** offers a wide range of products and services intended for professionals of the glass industry worldwide. The Group gathers together STRATO® and TK which is specialized in the design and construction of ovens for the lamination, tempering, chemical tempering and heat soaking of glass.

STRATO® is the only EVA film produced in Italy: it is a thermosetting material and it is not sensitive to moisture and water. It is used for laminating safety glass without running the risk of de-lamination. STRATO® is certified according to European (UNI EN ISO) and American (SGCC - ANSI) standards. Local units in Europe (Italy), North America (USA) and South America (Brasil).



**Satinal Group** ofrece una amplia gama de productos y servicios destinados a los profesionales de la industria del vidrio en todo el mundo. El Grupo reúne a STRATO® y TK, especializados en el diseño y la construcción de hornos para la laminación, el templado, el templado químico y heat soaking del vidrio. STRATO® es la única película de EVA producida en Italia: es un material termoestable e insensible a humedad y agua. Se utiliza para laminar vidrio de seguridad sin correr el riesgo de deslaminación. STRATO® está certificado según las normas europeas (UNI EN ISO) y americanas (SGCC - ANSI). Subsidiarias propias en Europa (Italia), América del Norte (USA) y América del Sur (Brasil).

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## Skill Glass

**SKILL GLASS** manufactures vertical glass grinding, drilling and milling lines in superior quality systems that combine high technology and innovation to satisfy the most particular demands of customers.

The company began from the experience of Mr. Beniamino Dal Santo, who has been designing and creating glass processing machinery for 30 years.

The SKILL GLASS brand range includes large machines that can be used either in stand-alone settings or in line with other systems: vertical drilling and milling machines, machines for grinding and polishing, and sandblasting machines, as well as machines and systems built to specific requests.



**SKILL GLASS** produce líneas verticales para el esmerilado, el taladrado y el fresado vertical del vidrio, equipos de elevado estándar cualitativo que ofrecen alta tecnología e innovación, capaces de satisfacer las exigencias más particulares de los clientes.

La empresa nace de la experiencia del Sr. Dal Santo Beniamino, que desde hace 30 años diseña y crea máquinas para trabajar el vidrio.

La gama de la marca SKILL GLASS incluye máquinas de grandes dimensiones que pueden utilizarse en la versión de libre instalación o en línea con otros equipos: taladros y fresadores verticales, máquinas para el esmerilado y el pulido y máquinas arenadoras, así como máquinas y equipos especiales a pedido.



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## Solvitec SAS

**Solvitec** is the representative and link between the best factories of machinery, tools, suppliers and materials for the glass industry, present in Asia and Europe, and the Colombian businessman who transforms glass and elaborates designs based on this material. Furthermore, Solvitec refits and produces machinery that makes available to glass entrepreneurs to undertake their productive projects, while offering consulting service, preventive and corrective technical service and support in decision-making, from a professional and managerial approach, to boost the business and renew the market with new products. Solvitec aims at contributing to the competitiveness of the glass industry in Colombia and Latin America, through a permanent supply of machinery, raw materials, supplies, tools and services that meet market expectations.



**Solvitec** es el representante y enlace entre las mejores fábricas de vidrio, maquinaria y materiales para esta industria, presentes en Asia y Europa, y el empresario colombiano que transforma el vidrio y elabora diseños basados en este material. Así mismo, Solvitec reacondiciona y produce maquinarias que pone a disposición de los empresarios vidrieros para emprender sus proyectos productivos, al tiempo que ofrece asesoría, servicio técnico preventivo y correctivo y acompañamiento en la toma de decisiones, desde un enfoque profesional y gerencial, para dinamizar el negocio y renovar el mercado con nuevos productos. La misión de Solvitec es contribuir a la competitividad de la industria del vidrio en Colombia y Latinoamérica, a través de una oferta permanente de maquinaria, materias primas, insumos, herramientas y servicios que respondan a las expectativas del mercado.



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## S.T. Group

**S.T. GROUP Srl** is a new company that has taken over all Marval brand., activer for different years on the double glazing sector worldwide. Nowadays S.T. GROUP develops all the advanced technologies in the production of insulating glass. Everything is designed, manufactured and tested in S.T. GROUP headquarter in Mariano Comense (Como - Italy).

S.T. GROUP can offer a wide range of products including:

- vertical and horizontal washing machines
- automatic gas press
- automatic sealing machines
- complete semiautomatic and automatic IG lines
- automatic bending profile machines
- automatic dessicant filling machines
- butyl extruder

Contact person in Colombia:  
**Andres Cante**  
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**S.T. GROUP** es una nueva empresa que ha adquirido Marval, presente en todo el mundo desde hace varios años en el sector del doble acristalamiento. S.T. GROUP actualmente desarrolla todas las tecnologías avanzadas el la producción del doble acristalamiento.

Todos los productos S.T. GROUP se diseñan, fabrican y experimentan en nuestra sede central en Mariano Comense (Como - Italia).

S.T. GROUP ofrece una amplia gama de productos, que incluyen:

- lavadoras verticales y horizontales
- prensa automática de gas
- robot de sellado automático
- líneas automáticas y semiautomáticas para doble acristalamiento
- dobladoras de perfiles autónomas
- maquinas llenadora de desecante automáticas
- butiladora

Persona de contacto en Colombia:  
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INSULATING GLASS MACHINERY

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## Henry Teichmann

Since 1947 **Henry F. Teichmann, Inc's** engineering, technical service, purchasing, construction and project management teams have been committed to providing turnkey services for batch plants, complete glass plants, container glass furnaces, float glass furnaces, fiberglass furnaces, foam glass furnaces, sodium silicate furnaces, pressed glass melting services, hand glass processes, tableware & lighting products. World famous Lehr supplier E.W. Bowman is part of HFT. Bowman specializes in the supply of container glass Annealing Lehrs, Decorating Lehrs, Mould Pre-Heating Kilns, Belt Cleaning Brushes, Lehr process consultation & Lehr overhauls.



EWB

**HENRY F. TEICHMANN, INC.**  
Engineers and Contractors to the Glass Industry

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Desde 1947, los equipos de ingeniería, servicio técnico, compras, construcción y dirección de proyectos de **Henry F. Teichmann** se han comprometido a proporcionar servicios llave en mano para plantas discontinuas, plantas de vidrio completas, hornos eléctricos, hornos de vidrio de recipientes, hornos de vidrio flotado, hornos de fibra de vidrio, hornos de espuma de vidrio, hornos de silicato sódico, servicios de fusión de vidrio prensado, vajilla y productos de iluminación. En más de 70 años hemos efectuado del servicio de más de 1000 proyectos en todo el mundo. Nuestro personal de ingeniería ha proporcionado diseños de hornos utilizando hornos de paquetes regenerativos, hornos de encendido transversal, hornos de encendido trasero, hornos eléctricos y tecnologías de fusión de oxícombustión.



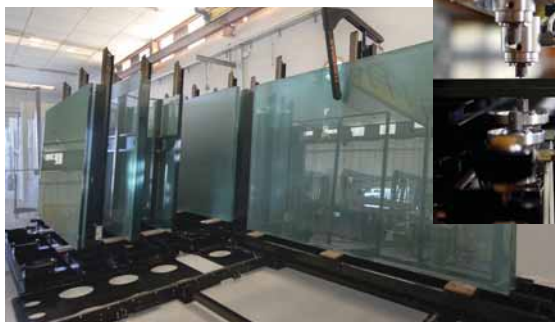
## Tuomas

Con mas de 30 años en la industria y colaboraciones con los principales procesadores y fabricantes de vidrio, **TUOMAS** se ha convertido en una referencia global en maquinaria inteligente para almacenar, cargar y cortar vidrio en mercados como la automoción, arquitectura o decoración. Todo el diseño, fabricación, programación y ensamblaje de la maquinaria se realiza en España utilizando componentes europeos de máxima calidad para garantizar la fiabilidad, seguridad, rendimiento y precisión que se espera de una marca líder. TUOMAS ofrece una completa gama de maquinaria estandarizada, aunque muchos de los equipos están diseñados a medida de las exigencias de sus clientes.

Aparte de España, tiene delegación en Santiago de Chile, Sao Paulo y, desde noviembre de 2019, también en Bogotá.

With more than 30 years in the industry and collaborations with major processors and glass manufacturers, **TUOMAS** has become a global reference in smart machinery to store, load and cut glass in markets such as automotive, architecture or decoration.

All the design, manufacture, programming and assembly of the machinery is carried out in Spain using European components of the highest quality to guarantee the reliability, safety, performance and precision expected from a leading brand. TUOMAS offers a complete range of standardized machinery, although many of the equipment is designed to meet the requirements of its customers. Apart from Spain, it has offices in Santiago de Chile, Sao Paulo and, since November 2019, also in Bogota.



## TUOMAS

OUR PASSION, YOUR PROGRESS

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Delegaciones en  
Chile, Brasil y Colombia



## UAS Messtechnik

Represented by M Glass Factory Services



**UAS Messtechnik GmbH** is an innovative company of international reputation in the field of instrumentation engineering. Due to our broad know-how and conclusive complete solutions for all kind of process industry, we are the ideal partner to increase the efficiency of your plant.

Services:

- automation and control systems;
- combustion technology;
- glass technology ;
- environmental technology.

**UAS Messtechnik GmbH** es una compañía innovadora de reputación internacional en el campo de la ingeniería de instrumentación. Por tener un amplio know-how en las varias industrias de proceso, somos el partner ideal para incrementar la eficiencia de su planta.

Servicios:

- sistemas de automatización y control;
- tecnología de combustión;
- tecnología del vidrio;
- tecnología ambiental.

## UAS

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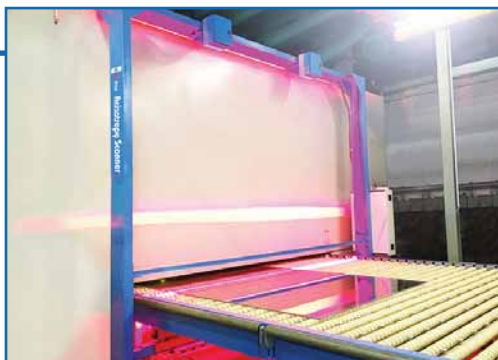
[www.uas.de](http://www.uas.de)

## Viprotron

Since 2004 **Viprotron** develops and produces innovative quality scanning devices for the flat glass processing industry in our Pfungstadt premises "Made in Germany". Worldwide our devices control reliably the quality of architectural glass. As OEM-partner of many leading machine builders, Viprotron could develop to the technology leader in quality control of architectural glass within the recent years. Our Quality Scanner 3D sets the standard among the quality control devices now for years. As manufacturer of outstanding inspection systems, Viprotron offers systems for each production stage from DIY install systems like the ECO Scanner - to use in different production areas after a washer - up to complex workflow improving systems like the Anisotropy & White Haze Scanner after a furnace.

Desde el 2004 **Viprotron** desarrolla y fabrica en sus instalaciones innovadores dispositivos "Made in Germany" para el control de calidad del vidrio arquitectónico. Como socio OEM de diversos fabricantes de maquinaria líderes en el sector, Viprotron ha podido evolucionar en los últimos años hasta una posición de líder tecnológico en el campo del control de calidad del vidrio arquitectónico. Desde hace años, nuestro Quality Scanner 3D fija el estándar de los dispositivos de control de calidad.

Viprotron ofrece equipos para cada fase de la producción que van desde los sistemas "DIY" como el ECO Scanner, hasta complejos sistemas para optimizar el proceso de trabajo como son los Anisotropy Scanner.



**viprotron**  
we inspect your glass.

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## Vismara OMV



Production of drilling and drilling / milling machines, both horizontal and vertical. Single-head, multi-head, with automatic tool changer and tool magazine at 8 + 8 - 10 + 10 - 20 + 20 positions.

**Vismara**

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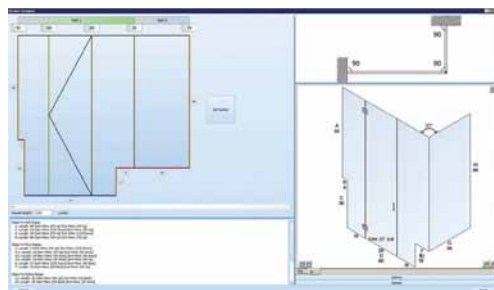
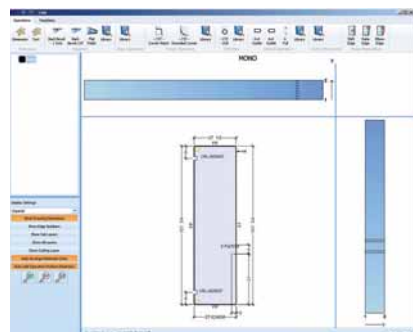
Producción de máquinas perforadoras y perforadoras / fresadoras, horizontales como verticales. Cabezal simple, cabezal múltiple, con cambiador automático de herramientas y almacén de herramientas en 8 + 8 - 10 + 10 - 20 + 20 posiciones.





## FENETECH

**FeneTech** will be presenting the latest release of their software solution FeneVision ULTIMATE ERP for glass fabricators. This integrated software operates on a graphical user interface running on a single database, allowing employees to see - in real time - exactly what is happening on the production floor. FeneVision provides all the tools necessary to control each phase of production,



including web and client-based quotation and order handling, pricing and costing, an integrated CAD for glass shapes, a comprehensive shower door designer that allows customers to choose their own hardware, the dynamic creation of bills of materials, capacity planning for variable demand, production scheduling, dynamic glass cutting optimization, Business Intelligence and more... Lider company in USA and in Europe! We are the right Partner!

**FeneTech** presentará su más reciente actualización de su solución en software FeneVision ULTIMATE ERP para procesadores de vidrio. Esta solución opera en una interface totalmente amigable y gráfica, que va guiando al usuario en todo momento, el sistema corre en una sola BD (Base de Datos), permitiendo que los usuarios vean en TIEMPO REAL exactamente lo que está sucediendo en su piso de producción y en toda la empresa. FeneVision brinda todas las herramientas necesarias para controlar cada fase de la producción, incluyendo una aplicación web (WEB CENTER) que permite cotizar y colocar pedidos desde web, así como también un control de precios y costos, un CAD, un diseñador de duchas de baño, reportes online (BI) y más... No por nada somos la solución líder en USA y Europa! Somos el partner correcto!



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## Vitelsa Vidrios de Seguridad



Vitelsa Safety Glasses, Processing Specialists for the Construction Industry, Pioneers in Glass Insulation Conversion, Solar Control, Low Emissive Low E, Structural Laminate, Laminate Architecture, Multilaminate, Screen Printing, Digital Printing, Curved Tempering and Large Plane format, through our 6 factories of production in Colombia located in the cities of Bucaramanga, Cali, Medellín, and Bogota, infrastructure that allows us a production of 120 Tons daily. Complying with the highest standards of quality and safety established in national and international technical standards.

Vitelsa vidrios de seguridad, especialistas en procesamiento para la industria de la construcción, pioneros en la transformación de vidrios Insulado, Control Solar, Bajo Emisivo Low E, Laminado Estructural, Laminado Arquitectura, Multilaminado, Serigrafía, Impresión Digital, Templado Curvo y Plano de gran formato, a través de nuestras 6 fábricas de producción en Colombia ubicadas en las ciudades de Bucaramanga, Cali, Medellín, y Bogotá, infraestructura que nos permite una producción de 120 Toneladas diarias. Cumpliendo con los más altos estándares de calidad y seguridad establecidos en normas técnicas nacionales e internacionales.



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## COMPANY

website

## COMPANY

website

**A+W Software**

for Glass, Windows & Doors

**A+W SOFTWARE**

[www.a-w.com](http://www.a-w.com)

**Bando**  
BANDO KIKO CO.,LTD.

**BANDO KIKO**

[www.bandoj.com](http://www.bandoj.com)

**bestmakina**

**BEST MAKINA**

[www.bestmakina.com](http://www.bestmakina.com)

**Bystronic**  
glass  
Because we care

**BYSTRONIC GLASS GROUP**

[bystronic-glass.com](http://bystronic-glass.com)

**Cms**  
glass technology

**CMS**

[www.cmsindustries.it](http://www.cmsindustries.it)

**FILTRAGLASS**  
clear water, clean glass

**FILTRAGLASS**

[www.filtraglass.com](http://www.filtraglass.com)

**FOREL**

**FOREL**

[www.forelspa.com](http://www.forelspa.com)

**FORVET**  
The Blue Solution

**FORVET**

[www.forvet.it](http://www.forvet.it)

**GLASSCOMPANY**

**GLASS COMPANY**

[www.glasscompany.com](http://www.glasscompany.com)

**HEGLA**

**HEGLA**

[www.hegla.com](http://www.hegla.com)

**helios quartz**



**HELIOS QUARTZ**

[www.heliositalquartz.com](http://www.heliositalquartz.com)

**INTERMAC**

**INTERMAC - BIESSE**

[www.intermac.com](http://www.intermac.com)

**keraglass**

**KERAGLASS**

[www.keraglass.com](http://www.keraglass.com)

**LiSEC**

**LISEC GROUP**

[www.lisec.com](http://www.lisec.com)

**MAPPI**  
BEYOND GLASS PERFECTION

**MAPPI INTERNATIONAL**

[www.mappi.it](http://www.mappi.it)

**NorthGlass**

**NORTH GLASS TECHNOLOGY  
& JUISUN TECHNOLOGY INDUSTRIAL**

[www.northglass.global](http://www.northglass.global)

**Rollmac**  
**Gemata**

**ROLLMAC DIVISION OF GEMATA**

[www.rollmac.it](http://www.rollmac.it)

**THERMOSEAL**  
GROUP  
Dedicated to Insulated Glass

**THERMOSEAL GROUP**

[www.thermosealgroup.com/](http://www.thermosealgroup.com/)

**ŞİŞECAM**  
FLAT GLASS

**TRAKYA CAM - ŞİŞECAM GROUP**

[www.sisecamflatglass.com](http://www.sisecamflatglass.com)

**TUROMAS**  
OUR PASSION, YOUR PROGRESS

**TUROMAS**

[www.turomas.com](http://www.turomas.com)

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## Glass manufacturing and Processing

### FLOAT GLASS

Bavelloni  
Optris  
Sisecam

### PROCESSED SHEET GLASS

**CMS**  
**North Glass Technology**  
Optris

### LAMINATED SAFETY GLASS

Kuraray - Trosifol

### MIRRORS

**CMS**

## Stocking, handling and movement

### COMPLETE STOCKING LINES / ENGINEERING

**Bystronic glass Group**  
Cugher Glass  
ECOL  
**Hegla**  
IOCCO Group  
**Keraglass**  
**Lisec Group**  
**North Glass Technology**  
MOVETRO  
Schiavo  
Torgauer Maschinenbau  
**Tuomas**

### COMPLETE HANDLING AND MOVEMENT LINES

**Bando Kiko**  
Bottero  
**Bystronic glass Group**  
Cugher Glass  
**CMS**  
ECOL  
**Forvet**  
**Hegla**  
Giardina Finishing + HS  
Glassprinting  
IOCCO Group  
**Keraglass**  
**Lisec Group**  
**North Glass Technology**  
Schiavo  
Torgauer Maschinenbau  
**Tuomas**

### MACHINES FOR HANDLING GLASS SHEETS

Ashton Industrial Sales  
**Bando Kiko**  
Bavelloni  
Bottero  
**Bystronic glass Group**  
**CMS**  
ECOL  
**Forel**  
Goldglass Technologies  
Guangdong Northglass  
& Juisun Technology  
Industrial  
**Hegla**  
IOCCO Group  
Italcarrilli  
**Keraglass**  
**Lisec Group**  
Schiavo  
Torgauer Maschinenbau  
**Tuomas**

### HANDLING ROBOTS

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

### HANDLING EQUIPMENT FOR FLOAT GLASS

Bovone Elett.  
Bottero  
**Bystronic glass Group**  
ECOL  
Goldglass Technologies  
**Hegla**  
IOCCO Group  
Italcarrilli  
**Lisec Group**  
Schiavo  
Torgauer Maschinenbau  
**Tuomas**

### TROLLEYS AND CLASSIFIERS

**CMS**  
**Forel**  
**Hegla**  
**Lisec Group**  
MOVETRO  
Schiavo  
Tecno Glass  
Torgauer Maschinenbau  
**Tuomas**

### TRANSPORTATION SYSTEMS/ TRUCKS

Giardina Finishing + HS  
Glassprinting

**Hegla**  
Italcarrilli  
**Lisec Group**  
Schiavo

### VACUUM LIFTING EQUIPMENT

Bottero  
**Bystronic glass Group**  
**CMS**  
ECOL  
Fenzi  
**Forel**  
**Hegla**  
**Lisec Group**  
Schiavo  
Torgauer Maschinenbau  
**Tuomas**

### CRANE SUCTION CUPS FOR LARGE SHEETS

Bottero  
**Bystronic glass Group**  
Fenzi  
**Hegla**  
**Lisec Group**  
Schiavo  
**Tuomas**

### TRANSPORTATION TONGS

Bottero  
Fenzi  
IOCCO Group  
Schiavo  
**Tuomas**

### SUCTION CUPS

ADI  
Bottero  
**Bystronic glass Group**  
**CMS**  
Fenzi  
**Hegla**  
Schiavo  
**Tuomas**

### CONVEYOR BELTS

Ashton Industrial Sales  
**Bystronic glass Group**  
Cugher Glass  
ECOL  
Schiavo  
**Tuomas**

### PACKAGING MATERIALS AND SYSTEMS

ECOL  
**Hegla**  
Schiavo

### ACCESSORIES

Bottero

## CMS

Fenzi  
**Hegla**  
**Helios Quartz**  
Mole Moreschi  
Schiavo  
**Tuomas**

## Straight-edge and shape cutting

### COMPLETE STRAIGHT-EDGE LINES

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

### COMPLETE SHAPE CUTTING LINES

**Bando Kiko**  
Bavelloni  
Bottero  
**Bystronic glass Group**  
**CMS**  
Guangdong Northglass & Juisun Technology Industrial  
**Hegla**  
**Lisec Group**  
Schiavo  
Shanghai North Glass Technology  
**Tuomas**

### AUTOMATIC CUTTING MACHINES FOR AUTOMOTIVE GLASS

**Bando Kiko**  
Bottero  
**Bystronic glass Group**  
**CMS**  
Glaston  
IOCCO Group  
**Lisec Group**  
Schiavo

### LOADING AND TILTING MACHINES

**Bando Kiko**  
Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

ECOL

Euromec

**Forel**

**Glass Company**

**Hegla**

**Intermac - Biesse**

IOCCO Group

**Lisec Group**

Schiavo

Tenon (Beijing) Equipment

**Tuomas**

### CUTTING TABLES

**Bando Kiko**

Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

Euromec

Fenzi

**Forel**

**Hegla**

IOCCO Group

**Lisec Group**

Macotec

Schiavo

Tekno Kilns

Tenon (Beijing) Equipment

TK

Triulzi

**Tuomas**

### CUTTING OPTIMIZERS

**Bando Kiko**

Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

Deltamax Automazione

Euromec

**Forel**

**Hegla**

IOCCO Group

**Lisec Group**

Optima

Schiavo

**Tuomas**

### CUTTING PATH OPTIMIZERS

**Bando Kiko**

Bottero

**Bystronic glass Group**

**CMS**

Euromec

IOCCO Group

**Lisec Group**

Optima

Schiavo

## CAD SYSTEMS

Bavelloni

**CMS**

**Lisec Group**

Prodim

Schiavo

## ARMoured AND LAMINATED GLASS CUTTING MACHINES

**Bando Kiko**

Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

**Hegla**

**Lisec Group**

Schiavo

**Tuomas**

## ROUND OR SHAPE CUTTING MACHINES

**Bando Kiko**

Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

Fenzi

**Hegla**

**Lisec Group**

Schiavo

**Tuomas**

## CUTTING ACCESSORIES

ADI

Ayrox

**Bando Kiko**

Bottero

Fenzi

IOCCO Group

Schiavo

Softeco

Talamoni

**Tuomas**

Tyrolit Vincent

## SAW MACHINES

Schiavo

Tecno Glass

## AUTOMATIC SAWS FOR CUTTING LAMINATED AND BULLET-PROOF GLASS

**CMS**

Schiavo

## BREAKING SYSTEMS

**Bando Kiko**

Bavelloni

Bottero

**Bystronic glass Group**

**CMS**

Euromec

**Hegla**

IOCCO Group

**Lisec Group**

Schiavo

**Tuomas**

## CUTTING MACHINES WITH BREAKING AND EDGE DELETING DEVICES

**Bando Kiko**

Bottero

**Bystronic glass Group**

**CMS**

Euromec

Guangdong Northglass

& Juisun Technology

Industrial

**Hegla**

IOCCO Group

**Lisec Group**

Schiavo

**Tuomas**

## GLASS CUTTING FLUIDS

Diamant - AR Nunziata

Schiavo

**Tuomas**

## ACCESSORIES

Schiavo

Schiatti Angelo

Talamoni

**Tuomas**

## Edging and bevelling

### COMPLETE EDGING LINES

Adelio Lattuada

Ashton Industrial Sales

B Solution Licensee of BF

Project

**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  
**Bystronic glass Group**  
Hiseng Glass Machinery  
**Intermac - Biesse**  
IOCCO Group  
SKG - Skill Glass

## DOUBLE-EDGE GRINDING MACHINES

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

## VERTICAL-EDGE GRINDING MACHINES

Adelio Lattuada  
B Solution Licensee of BF Project  
**Bando Kiko**  
Bavelloni  
Bottero  
**Bystronic glass Group**  
**Forel**  
**Glass Company**  
Hiseng Glass Machinery  
Schiavo  
Schiatti Angelo  
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 Licensee of BF Project  
Bavelloni  
**CMS**  
**Intermac - Biesse**  
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  
Tenon (Beijing) Equipment

## LATHES - VERTICAL AND HORIZONTAL

**CMS**  
Fenzi

## EMBOSSING MACHINES

**CMS**  
Fenzi

## PORTABLE MACHINES

Fenzi  
**Helios Quartz**  
Tecno Glass

## DIAMOND TOOLS

Adelio Lattuada  
ADI  
Ashton Industrial Sales  
**Bando Kiko**  
Bovone Diamond Tools  
Bottero  
Diamant - AR Nunziata  
Diamut - Biesse  
Fenzi  
Glaston  
Mole Moreschi  
Schiavo  
Talamoni  
Tyrolit 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  
Italmole

Mole Moreschi  
RBM Italia  
Schiavo  
Tyrolit Vincent

## POLISHING AGENTS AND OXIDES

ADI  
Bovone Diamond Tools  
Diamant - AR Nunziata  
Fenzi  
Schiavo  
Tyrolit Vincent

## POLISHING BELTS

Diamant - AR Nunziata  
Fenzi  
Schiavo

## COOLANTS

Adelio Lattuada  
Bovone Diamond Tools  
Fenzi  
Schiavo

## GLASS GRINDING AND BEVELLING COOLANTS

Schiavo

## SEPARATORS FOR GLASS-SOLIDS

Ashton Industrial Sales  
Schiavo

## ACCESSORIES

ADI  
**CMS**  
Fenzi  
Forza G / G. Tech  
**Helios Quartz**  
IOCCO Group  
Mole Moreschi  
Schiavo  
Schiatti Angelo  
Tyrolit Vincent

## Washing

## HORIZONTAL WASHING MACHINES

Ashton Industrial Sales  
**Bando Kiko**  
Bavelloni  
Bovone Elett.  
**Bystronic glass Group**  
ECOL  
**Forel**  
**Glass Company**  
Hiseng Glass Machinery

IOCCO Group  
**Lisec Group**  
Neptun  
Schiavo  
Triulzi

## VERTICAL WASHING MACHINES

Adelio Lattuada  
Ashton Industrial Sales  
Bavelloni  
**Best Makina**  
**Bystronic glass Group**  
ECOL  
**Forel**  
**Glass Company**  
Hiseng Glass Machinery  
IOCCO Group  
**Lisec Group**  
Neptun  
Schiavo  
Shanghai North Glass Technology  
S.T. Group  
Stefiglass  
Tenon (Beijing) Equipment  
Triulzi

## WASHING MACHINES FOR AUTOMOTIVE GLASS

**Bando Kiko**  
**Bystronic glass Group**  
ECOL  
IOCCO Group  
Triulzi

## WASHING PURIFICATION SYSTEMS

**Bystronic glass Group**  
**Forel**  
Forza G / G. Tech  
**Glass Company**  
IOCCO Group  
Schiavo  
Tenon (Beijing) Equipment

## LIQUID WASHING CONCENTRATES

Diamant - AR Nunziata  
Schiavo

## SEPARATORS FOR GLASS-SOLIDS

Vitrosep  
**Filtraglass**

## 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**  
**Bystronic glass Group**  
**Forel**  
**Glass Company**  
Neptun  
Schiavo  
S.T. Group  
Tenon (Beijing) Equipment  
**Thermoseal Group**

Triulzi

### AUTOMATIC SEALING LINES

Bavelloni  
**Bystronic glass Group**  
**Forel**  
**Lisec Group**  
S.T. Group

### AUTOMATIC SPACER BENDING MACHINES

Bavelloni  
**Best Makina**  
**Bystronic glass Group**  
Fenzi  
**Forel**  
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**  
**Bystronic glass Group**  
Di Gregorio  
Fenzi  
**Forel**  
**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**  
Fenzi  
**Forel**  
**Lisec Group**  
Neptun  
Schiavo  
S.T. Group  
Tecno Glass  
Tenon (Beijing) Equipment  
**Thermoseal Group**

### BUTYL EXTRUDERS

Bavelloni  
**Best Makina**  
**Bystronic glass Group**  
**Forel**  
**Lisec Group**

Neptun  
Schiavo  
S.T. Group  
Tecno Glass  
Tenon (Beijing) Equipment  
**Thermoseal Group**  
Triulzi

### HOT-MELT EXTRUDERS

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

### POLYURETHANE EXTRUDERS

Bavelloni  
**Best Makina**  
**Bystronic glass Group**  
Fenzi  
**Forel**  
**Lisec Group**  
Schiavo  
S.T. Group  
Tecno Glass

### POLYURETHANE ENCAPSULATION

**Bystronic glass Group**  
**Lisec Group**  
Schiavo

### SILICONE EXTRUDERS

**Best Makina**  
**Bystronic glass Group**  
Fenzi  
**Forel**  
**Lisec Group**  
Schiavo  
S.T. Group  
Tecno Glass  
Tenon (Beijing) Equipment  
Triulzi

### POLYSULPHIDE SEALANT EXTRUDERS

**Best Makina**  
**Bystronic glass Group**  
Fenzi  
**Forel**  
**Lisec Group**  
Schiavo  
Tecno Glass  
Tenon (Beijing) Equipment  
Triulzi



## GAS FILLING EQUIPMENT

### Bystronic glass Group

Fenzi

### Forel

### Lisec Group

Neptun

Schiavo

Sparklike

S.T. Group

Tecno Glass

Tenon (Beijing) Equipment

### Thermoseal Group

## DESICCANT SALTS

Ashton Industrial Sales

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

Forza G / G. Tech

### Helios Quartz

Schiavo

Sparklike

S.T. Group

Tenon (Beijing) Equipment

Triulzi

## Tempering

### TEMPERING FURNACES (ARCHITECTURAL GLASS)

CNUD-EFCO

Glaston

### Glass Company

Glasstech Inc.

Hornos Industriales Pujol

### Keraglass

Landglass Technology

Lema

### Lisec Group

### Mappi International

Mazzaroppi Engineering

Schiavo

Shanghai North Glass

Technology

Tekno Kilns

TK

### TEMPERING FURNACES (AUTOMOTIVE GLASS)

Glaston

### Glass Company

Glasstech Inc.

### Keraglass

Landglass Technology

### Mappi International

Mazzaroppi Engineering

SGLASS

Shanghai North Glass

Technology

### CHEMICALS TEMPERING EQUIPMENT

### Glass Company

R.C.N. Solutions

## ACCESSORIES

CNUD-EFCO

Deltamax Automazione

Fenzi

Glaston

### Glass Company

### Helios Quartz

Hornos Industriales Pujol

### Keraglass

Landglass Technology

### Mappi International

Mazzaroppi Engineering

R.C.N. Solutions

SGLASS

Tekno Kilns

TK

Torgauer Maschinenbau

## Bending

### BENDING FURNACES (ARCHITECTURAL GLASS)

Glaston

### Glass Company

Glasstech Inc.

Hornos Industriales Pujol

### Keraglass

### Mappi International

Mazzaroppi Engineering

R.C.N. Solutions

SGLASS

Tekno Kilns

TK

### BENDING FURNACES (AUTOMOTIVE GLASS)

CNUD-EFCO

Glaston

### Glass Company

Glasstech Inc.

### Keraglass

### Mappi International

Mazzaroppi Engineering

R.C.N. Solutions

## ACCESSORIES

Ayrox

Deltamax Automazione

Glaston

### Glass Company

Glasstech Inc.

Hornos Industriales Pujol

### Keraglass

### Mappi International

Softeco

Tekno Kilns

TK

## Laminated glass production

### COMPLETE PLANTS

Bovone Elett.

Bottero

### Bystronic glass Group

### Forel

Glaston

### Glass Company

Hornos Industriales Pujol

IOCCO Group

### Lisec Group

Mazzaroppi Engineering

R.C.N. Solutions

Triulzi

### LAMINATED WINDSCREEN BENDING FURNACES

ECOL

Glaston

### Glass Company

Glasstech Inc.

### Keraglass

### Mappi International

## AUTOCLAVES

### Bystronic glass Group

Glaston

### Glass Company

Hornos Industriales Pujol

### Lisec Group

Triulzi

## CLIMATIC CABINS

### Bystronic glass Group

### Forel

IOCCO Group

### Lisec Group

Triulzi

## INFRARED OVENS

### Bystronic glass Group

ECOL

### Forel

### Glass Company

Hornos Industriales Pujol

IOCCO Group

### Lisec Group

SGLASS

Triulzi

### PRESSES/BENDING MACHINES

### Forel

IOCCO Group

### Lisec Group

Triulzi

### RESIN LAMINATING MATERIALS AND EQUIPMENT

IOCCO Group

Torgauer Maschinenbau

## PVB

Everlam

Kuraray - Trosifol

### PVB - SHAPING AND CUTTING EQUIPMENT

Ayrox

### Bystronic glass Group

ECOL  
**Forel**  
IOCCO Group  
**Lisec Group**  
Softeco

## PVB - WIRING TECHNOLOGY FOR HEATABLE LAMINATES

Ayrox  
ECOL  
Softeco

## ACCESSORIES

Ayrox  
Bottero  
Deltamax Automazione  
Glaston  
**Helios Quartz**  
Hornos Industriales Pujol  
IOCCO Group  
**Lisec Group**  
Optris  
Softeco  
Triulzi

## Drilling

### AUTOMATIC DRILLING LINES

B Solution Licensee of BF  
Project  
**Bando Kiko**  
Bavelloni  
**Bystronic glass Group**  
**Forvet**  
Guangdong Northglass  
& Juisun Technology  
Industrial  
**Intermac - Biesse**  
IOCCO Group  
Schiatti Angelo  
SKG - Skill Glass

### MULTI-SPINDLE DRILLING MACHINES

B Solution Licensee of BF  
Project  
**Bando Kiko**  
Bavelloni  
**Bystronic glass Group**  
**CMS**  
**Forvet**  
**Glass Company**  
**Intermac - Biesse**  
IOCCO Group  
Schiavo  
Schiatti Angelo  
SKG - Skill Glass

### DRILLING MACHINES WITH OPPOSITE DRILLING HEADS

B Solution Licensee of BF  
Project  
**Bando Kiko**  
Bavelloni  
Bottero  
**Bystronic glass Group**  
**CMS**  
Fenzi  
**Forvet**  
Hiseng Glass Machinery  
**Intermac - Biesse**  
IOCCO Group  
Schiavo  
Schiatti Angelo  
SKG - Skill Glass

### COLUMN DRILLING MACHINES

B Solution Licensee of BF  
Project  
Bottero  
Fenzi  
Schiavo

### PORTABLE DRILLING MACHINES

**CMS**  
Fenzi  
Schiavo

### DRILLING AND MILLING MACHINES

Bavelloni  
Bottero  
**CMS**  
**Forvet**  
IOCCO Group  
Schiavo  
SGLASS

### DIAMOND DRILLS

ADI  
Bovone Diamond Tools  
Diamant - AR Nunziata  
Diamut - Biesse  
Fenzi  
Glaston  
Mole Moreschi  
Schiavo  
Tyrolit Vincent

### ACCESSORIES

**CMS**  
Fenzi  
Schiavo



## Other equipment and plants

### TURNKEY PLANTS / ENGINEERING - FOR BUILDING GLASS

**Bando Kiko**  
Bottero  
**Bystronic glass Group**  
Cugher Glass  
**Intermac - Biesse**  
IOCCO Group  
**Keraglass**  
**Lisec Group**  
Torgauer Maschinenbau

### TURNKEY PLANTS / ENGINEERING - FOR AUTOMOTIVE GLASS

**Bando Kiko**  
Bottero  
**Bystronic glass Group**  
Cugher Glass  
Easy Automation  
**Intermac - Biesse**  
IOCCO Group

### KEY PLANTS / ENGINEERING - FOR DISPLAY GLASS

**Bando Kiko**  
Cugher Glass  
Torgauer Maschinenbau

### WORKING CENTRES - CNC CONTROLLED

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

### FLOAT PLANTS/LINES (EQUIPMENT & ACCESSORIES)

Bovone Elett.  
IOCCO Group  
Optris

### CONSULTING SERVICES

Horn

### 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 (CYD, ROLLER, CURTAIN COATERS, DRYERS)

Giardina Finishing + HS  
Glassprinting  
Goldglass Technologies  
Horn

### SANDBLASTING SYSTEMS, EQUIPMENT AND PLANTS - OPTIMIZERS

Fenzi  
Fratelli Pezza  
**Glass Company**  
Schiavo  
SKG - Skill Glass

### DIGITAL INKJET PRINTERS

**Glass Company**

### SCREEN PRINTING EQUIPMENT AND PLANTS

Ayrox  
COMSS  
Cugher Glass  
Deltamax Automazione  
ECOL  
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  
TK

**ACCESSORIES**  
Deltamax Automazione  
**Helios Quartz**

## Miscellaneous

### AUTOMATION

Ashton Industrial Sales  
Goldglass Technologies  
IOCCO Group  
Horn  
Optris  
Torgauer Maschinenbau  
Zippe

### AUTOMOTIVE GLASS APPROVAL SERVICES

Ayrox  
Softeco

### AUTOMOTIVE GLASS QUALITY CONTROL

Ayrox  
**Bando Kiko**

### Bystronic glass Group

Cugher Glass  
Deltamax Automazione  
Easy Automation  
Glaston  
IOCCO Group  
Optris  
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

Ayro  
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**

### 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**

### INFRARED TUBES

**Helios Quartz**  
Deltamax Automazione

### KILNS

**Glass Company**  
Horn  
**Keraglass**  
**Lisec Group**  
Tekno Kilns  
TK

### METAL ACCESSORIES

Fenzi

### METALLIC SECTIONS

Fenzi

### NUMERICAL CONTROL SYSTEM (CNC) FOR ALL GLASS PROCESSING MACHINES

**Glass Company**  
IOCCO Group  
Prodim

### OPTICAL DISTORTION ANALYSERS FOR AUTOMOTIVE GLASS

IOCCO Group  
**Keraglass**

### OPTICAL INFRARED THERMOMETERS

Optris

### POWDER OR LIQUID APPLICATION SYSTEMS FOR PROTECTING FLOAT GLASS

Cugher Glass  
Giardina Finishing + HS  
Glassprinting  
**Glass Company**

### PUMPING AND APPLICATION SYSTEMS (AUTOMOTIVE GLASS)

IOCCO Group

### PURIFIERS FOR REFLUENT WATER

Forza G / G. Tech

### PUTTIES AND SEALANTS

Fenzi

### QUARTZ EQUIPMENT

**Helios Quartz**

### SHAPE CHECKING DEVICES

Easy Automation  
IOCCO Group

### SIC HEATERS

**Helios Quartz**

### SOFTWARE DATABASE, PROPERTY PREDICTOR

Synerglass Soft

### SOFTWARE SYSTEMS FOR PRODUCTION CONTROL

**A+W Software  
CMS**

Cugher Glass  
Deltamax Automazione  
Edgetech Europe

**Forel**

**Lisec Group**

Optima  
Prodim  
Synerglass Soft

### SOLDERING EQUIPMENT FOR ELECTRICAL CONNECTORS FOR WINDSCREENS AND BACKLITES

Ayrox  
Easy Automation  
Softeco

### SORTING SYSTEMS

**Bystronic glass Group**  
**Lisec Group**

### SURFACE STRESS MEASUREMENT INSTRUMENT

Ayrox  
**Glass Company**  
Jeffoptics

### TESTING FOR SOLDERINGS

Ayrox  
Easy Automation  
Softeco

### TESTING DEVICES OF BACKLITES ELECTRICAL HEATING

Ayrox  
Softeco

### THERMAL IMAGING SYSTEMS

Easy Automation  
**Glass Company**

### TIN FLOAT BATH FURNACES

IOCCO Group

### UV LAMPS

**Helios Quartz**

### UV PORTABLE MACHINES

**Helios Quartz**



**GLASS**  
TECHNOLOGY EXPO 2019

# PEEK INTO THE FUTURE

Zak returns to New Delhi with the 17<sup>th</sup> edition of India's leading expo on glass processing and its allied technologies. Be a part of the grand display of latest advancements in the field by industry pioneers.

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**ALUMINIUM  
EXTRUSIONS**  
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FOSG  
Setting the Standards  
for Glass Safety



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# SMART GLASS STORAGE SYSTEMS

*Extremely robust structural design  
Outstanding performance and reliability  
Tailor-made solutions to fit your needs  
Finest quality components  
Industry 4.0 ready  
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## 4<sup>th</sup> Industry

When looking for efficiency and/or security, it is essential to automate processes and information.

The new TUROMAS software allows to know in real time the glass stock of the warehouse in order to manage it in an optimal and completely autonomous way.

**Colombia  
Glass**

See you in:  
20<sup>th</sup>-21<sup>st</sup> November  
Bogota, Colombia