



FLATGLASS

2024 world directory



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IS THE MOST EFFICIENT IN PERFORMANCE

-70% 
ENERGY SAVING



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60 Minutes

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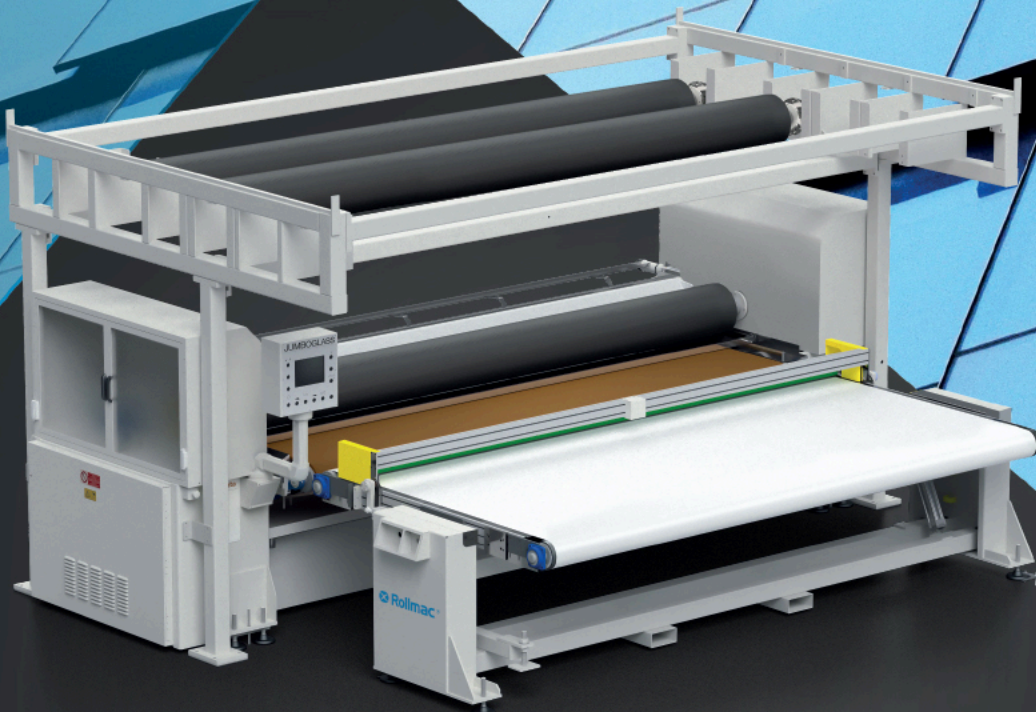
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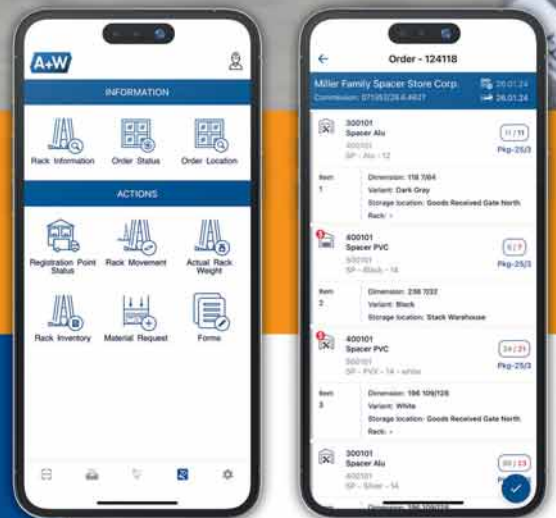
for Glass, Windows & Doors



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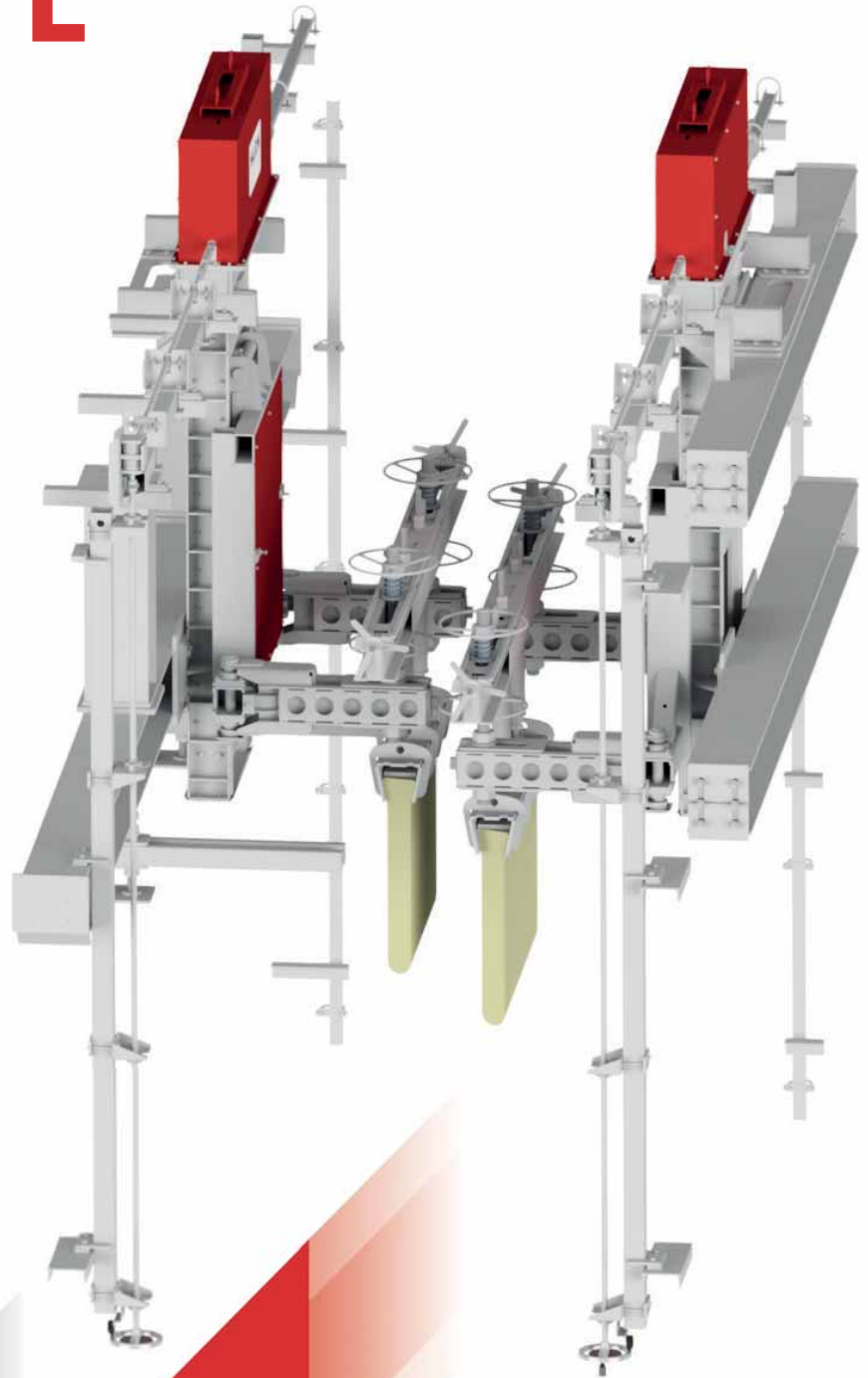
- Works as a mobile info terminal
- Securely and accurately scans barcodes individually or in continuous mode
- Increases employee productivity by displaying critical information, while also sending and receiving data to your ERP

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review - a year of news

103 FEBRUARY / MAY

159 JUNE / SEPTEMBER

287 OCTOBER / JANUARY 2024



08 FAIR CALENDAR

11 ADVERTISERS INDEX

| Region | Fair Name | Date | Location |
|--------|---|----------------|-------------------------|
| EUROPE | FAIR STEKLA | 27 February | Wrocław, Poland |
| EUROPE | SPAD - Glass Processing Automation Days | 6-8 March | Wrocław, Poland |
| EUROPE | FENESTRE ALI FRONTALE | 16-21 March | Munich, Germany |
| EUROPE | CHINA GLASS | 22-29 April | China |
| EUROPE | AUTOMOTIVE SMART GLASS FORUM | May | Barcelona, Spain |
| EUROPE | CONSTRUMAT | 22-24 May | Spain |
| EUROPE | WINDOEX | 22-24 May | Spain |
| EUROPE | GLASS SOUTH AMERICA | 24-25 June | Buenos Aires, Argentina |
| EUROPE | TECO 2024 | 24-25 June | Buenos Aires, Argentina |
| EUROPE | GLASSTECH MEXICO | 27-28 July | Mexico |
| EUROPE | GLASSBUILD AMERICA | 25 September | Orlando, USA |
| EUROPE | GLASSTEC | 20-21 October | Düsseldorf, Germany |
| EUROPE | GLASSBUILD EUROPE | 20-21 October | London, UK |
| EUROPE | GLASSBUILD ASIA | 16-18 November | Taipei, Taiwan |
| EUROPE | GLASSTECH ASIA | 16-18 November | Taipei, Taiwan |
| EUROPE | ZAK GLASS TECHNOLOGY | December | India |

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12 ALPHABETICAL INDEX

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| issue | exhibition/conference | date | venue | deadlines | |
|-------|---|--|---------------------------|---|---|
| 2024 |  |  | | Editorial files: 19-01-2024 Deadline Adv files: 26-01-2024 | |
| 2024 | 1 | MIR STEKLA | 27 February 1 March | MOSCOW Russia | Editorial files: 02-02-2024 Deadline Adv files: 09-02-2024 |
| | | GPAD - GLASS PERFORMANCE AUTOMATION DAYS | 5-6 March | NASHVILLE (TN) USA | |
| | | FENSTERBAU FRONTALE | 19-23 March | NUREMBERG Germany | |
| 2024 | 2 | CHINA GLASS | 25-28 April | SHANGHAI China | Editorial files: 25-03-2024 Deadline Adv files: 29-03-2024 |
| | | AUTOMOTIVE SMART GLASS FORUM | 8 May | BOLOGNA Italy | |
| | | CONSTRUMAT | 21-24 May | BARCELONA Spain | |
| | | WINDOREX | 22-24 May | CAIRO Egypt | |
| 2024 | 3 | GLASS SOUTH AMERICA | 12-15 June | SAO PAULO Brazil | Editorial files: 03-05-2024 Deadline Adv files: 10-05-2024 |
| | | ICCG 2024 | 24-26 June | DRESDEN Germany | |
| | | GLASSTECH MEXICO | 9-11 July | GUADALAJARA Mexico | |
| 2024 | 4 | GLASSBUILD AMERICA | 30 September 2 October | DALLAS (TX) USA | Editorial files: 29-07-2024 Deadline Adv files: 02-08-2024 |
| 2024 | 5 | GLASSTEC | 22-25 October | DÜSSELDORF Germany | Editorial files: 20-09-2024 Deadline Adv files: 30-09-2024 |
| | | ALL GLASSTEC EXHIBITORS ADVERTISING IN THIS ISSUE ALSO RECEIVE A FREE GLASSTEC PREVIEW  | | | |
| 2024 | 6 | VETECO | 5-8 November | MADRID Spain | Editorial files: 18-10-2024 Deadline Adv files: 29-10-2024 |
| | | EURASIA GLASS | 16-19 November | ISTANBUL Turkey | |
| | | GLASSTECH ASIA | 11-13 December | HO CHI MINH CITY Vietnam, | |
| | | ZAK GLASS TECHNOLOGY | December | DELHI India | |

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ADVERTISERS INDEX

| Advertisers | Company Profile | ADS | Data Sheet | Advertisers | Company Profile | ADS | Data Sheet |
|-------------------------|-----------------|-------------------|------------|-----------------------------------|-----------------|--------------------|------------|
| A+W SOFTWARE | 12-13 | 3 | 180-181 | GPM AUTOMATION | 42-43 | | 231-237 |
| ADELIO LATTUADA | 14-15 | | 182-184 | HEGLA | 44-45 | | |
| B SOLUTION | 16-17 | | 186-187 | HELIOS QUARTZ | 46-47 | 7 | 238 |
| BEST MAKINA | 18-19 | Back Cover | 188-189 | HORN GLASS INDUSTRIES | 48-49 | 4 | 239 |
| BIESSE GROUP | 20-21 | | 190-195 | ICCG | | 251 | |
| BOTTERO | 22-23 | | 196-202 | IMMMES | 50-51 | | 240-241 |
| BOVONE | 24-25 | | 203-205 | ITALCARRELLI | 52-53 | | 242-243 |
| GLASS SOUTH AMERICA | | 178 | | ITALMATIC | 54-55 | | 244-245 |
| CHINA GLASS | | Back Inside Cover | | ITALMOLE | 56-57 | | 246 |
| CMS | 26-27 | | 206-212 | KERAGLASS | 58-59 | | 247 |
| CUGHER GLASS | 28-29 | | 213-217 | LANDGLASS | 60-61 | | |
| DELTAMAX AUTOMATION | 30-31 | | 218-219 | LISEC | 62-63 | | 248-250 |
| EDGETECH EUROPE | 32-33 | 5 | 220 | MAPPI INTERNATIONAL | 64-65 | | 252-253 |
| FOREL | 34-35 | 9 | 221-225 | MARPOSS | 66-67 | | 254-256 |
| GIARDINA GLASS DIVISION | 36-37 | | 230 | MARVAL | 68-69 | | 257 |
| GLASS COMPANY | 38-39 | | 226-229 | MAZZAROPPI ENGINEERING | 70-71 | Front Cover | 258-261 |
| GLASSONLINE | | 102 | | MOLE MORESCHI | 72-73 | | 262 |
| GLASSTECH MEXICO | | 125 | | NEPTUN | 74-75 | | 263-265 |
| GLASTON | 40-41 | First Page | | NORTHGLASS | 76-77 | | |
| | | | | OPTRIS | 78-79 | | 266-268 |
| | | | | RCN SOLUTIONS | 80-81 | | 269 |
| | | | | ROLLMAC A DIVISION OF GEMATA | 82-83 | Front Inside Cover | 270-271 |
| | | | | SATINAL | 84-85 | | 272-273 |
| | | | | SCHIATTI | 86-87 | | 275 |
| | | | | SCHIAVO | 88-89 | | 276-277 |
| | | | | SKILL GLASS | 90-91 | | 278-279 |
| | | | | TALAMONI | 92-93 | | 280-281 |
| | | | | TEXPACK | 94-95 | | 282 |
| | | | | TRIULZI CESARE SPECIAL EQUIPMENTS | 96-97 | | 283-285 |
| | | | | TUOMAS | 98-99 | | 286 |
| | | | | UZGLASS | | 185 | |
| | | | | ZIPPE | 100-101 | 9 | |

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StartStop technology: zero unproductive costs
Super-Reliable Installation: no masonry work required

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for Glass, Windows & Doors



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Julia Schmidt - CFO
Dennis Tiegs - COO A+W Clarity

Annual turnover

EUR 27.106.080

Percentage of turnover from glass (%)

75

Number of Employees

184

Founding Year

1977

Registered Trademarks

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COMPANY PROFILE

A+W

Software for Glass, Windows and Doors

A+W is the global market leader for software in the flat glass industry as well as the windows and doors business. The company develops ERP-, PPS- and optimization software in order to make glass and window manufacturers even more efficient.

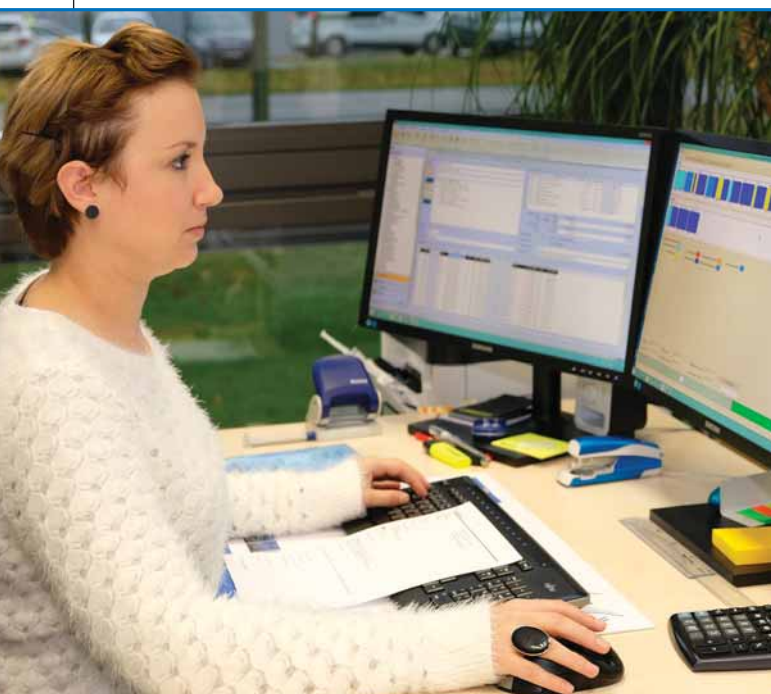
A+W solutions control and optimize the whole value chain, from basic glass to finished windows or façade elements. A+W products are suitable for small-, mid-sized and large companies.

Of course, A+W offers individual advice and consulting for its entire product range and supports users from the presentation of the systems through to live operation.

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A+W has been active on the market for more than 40 years and sells its products worldwide. A+W cooperates with the most experienced and competent companies in the industry. This close networking helps A+W to always provide the best possible solution for its customers' demands.

A+W is a wholly owned company of Constellation Software Inc., which is listed on the Toronto Stock Exchange under the symbol 'CSU'. The Corporation acquires, manages and builds vertical market software businesses.



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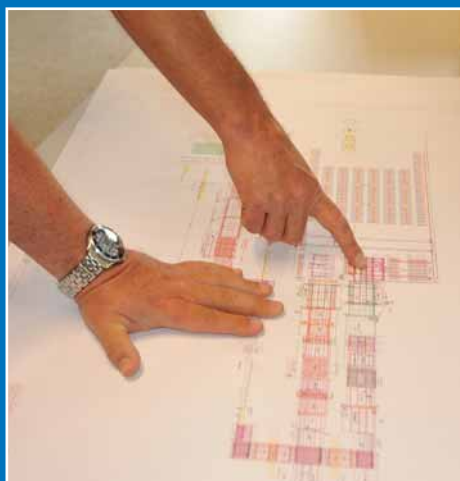
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Adelio Lattuada - President
Nicola Lattuada, Michela Lattuada - Partners

Sales

Domestic 5% / International 95%

Area

Office area 500 m2 / Plant area 3,500 m2

Number of Employees

44

Founding Year

1978

Capital

EUR 90,000.00

Planned Exhibitions 2024

Glass South America - San Paulo, Brazil - 12 / 15 June
Glasstech Mexico - Guadalajara, Mexico - 9 / 11 July
GlassBuild America - Dallas, USA - 30 Sept. / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October

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COMPANY PROFILE

MADE IN LATTUADA INTEGRATED SOLUTIONS, TO MEET ALL YOUR NEEDS



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Lattuada Automation solutions bring companies into the world of Industry 4.0, by making every machine a fusion of precision, productivity and automation.

STONE SOLUTIONS

Lattuada's many years of know-how transferred to natural stone, ceramic and composite material processing: PetrA, vertical edge polisher - Works with precision and quality on all types of edges, and, thanks to its natural versatility, is perfect for Stone Professionals production facilities.

SPECIAL MACHINES SOLUTIONS

Any special needs? Any out-of-standard processes? Do you treat composite materials? No problem. We can find the most suitable solution for you and customise our machines to ensure you get the flexibility you need.

GLASS SOLUTIONS

Customisation, precision, versatility: all Lattuada glass processing lines ensure excellent performance and high productivity, integrating perfectly into company realities. A combination of experience and innovation to meet any kind of challenge.

- Grinding

Our strength, always. A variety of solutions taking the shape of a wide range of machines: more than 40 possible models.

- Washing

For over 15 years we have been studying and providing solutions for glass washing. We offer a full range of high-tech, vertical washing machines that are easy to use and maintain.

- Complementary processing

Need to drill or process corners? We can provide a complete range of horizontal drilling machines and automatic radius as well as straight corner grinding machines.

AUTOMATION SOLUTIONS

Robotics, A-WR & i-AL Systems, Augmented Reality and IoT: a beating heart of innovation and technology that's revolutionising glass and stone processing.





B SOLUTION Srl

Via Spallanzani 6 - 24061 Albano S. Alessandro (BG) - Italy - Tel.: +39 - 035 - 4521234

E-mail: sales@bsolutionsrl.it - info@bsolutionsrl.it • www.bsolutionsrl.com

COMPANY DATA

Contacts

Gianluca Bonfanti - General Manager

Raffaello Bonfanti - Technical Manager

Nardo Daniele - Sales Manager



COMPANY PROFILE

B Solution has 30 years of experience and has developed a complete range of products suitable for both small and large glassworks, satisfying the most modern production requirements.

B Solution is specialized in:

GRINDING LINES

- Vertical NC Speed Edge
- Vertical Speed Arris
- Bilateral grinding flat edge
- Bilateral grinding round edge
- Shape rounding
- Shape radius

DRILLING AND MILLING LINES

- Vertical NC Speed drilling and milling
- Multi-head vertical drill
- Vertical drill template
- Horizontal modular drill

AUTOMATION AND MANIPULATION

- Loading manipulator
- Unloading manipulator
- Rotating platform
- Shuttle
- Turning device
- Transfer
- Horizontal diverter 0-90

CUSTOMIZED LINES FOR:

- Home appliance industry
- Automotive industry
- Structural industry
- Furniture industry
- Small sizes

SPEED ARRIS



SPEED ARRIS

Speed Arris is B Solution's high-productivity vertical arrising machine specialized in rough grinding-arrising.

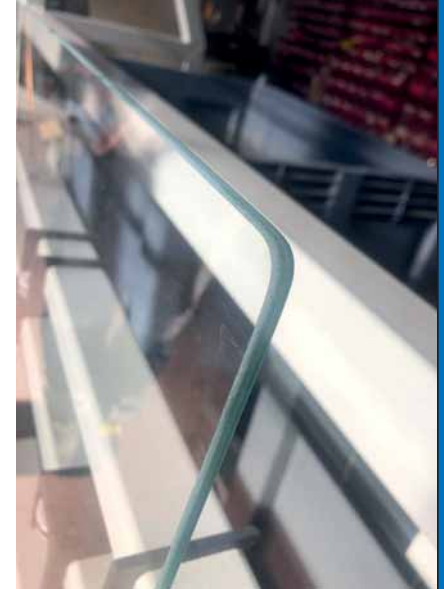
The machine can arris/grind two rectangular glass with different size and thickness, this guaranteeing high Productivity for double-glazing lines and also thanks to the continuous production cycle.

Glass transport and handling is carried out with suction cups, especially important for today's high-performance glass types.

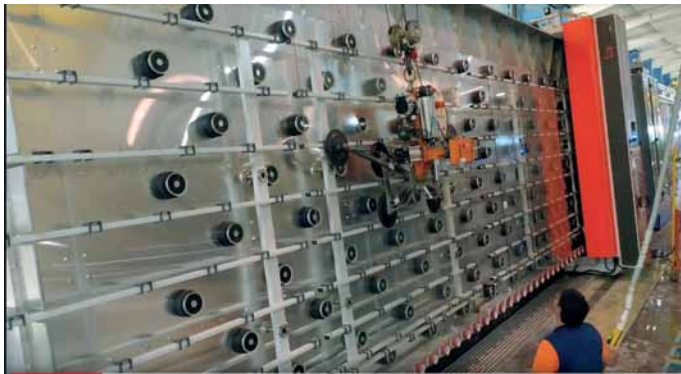
Regular arris is ensuring thanks to the oscillating spindle.

The Speed Arris can be integrated with IG or tempering line or as stand-alone machine.

A software for shaped glass is available upon request. Available in different size 2.0.3 - 2.6.4 - 2.8.5.



SPEED EDGE



BSolution's Speed Edge is a vertical compact grinder with the innovative patented follow-glass system, which carries out both rough and polished machining, flat and round edging, arising and milling.

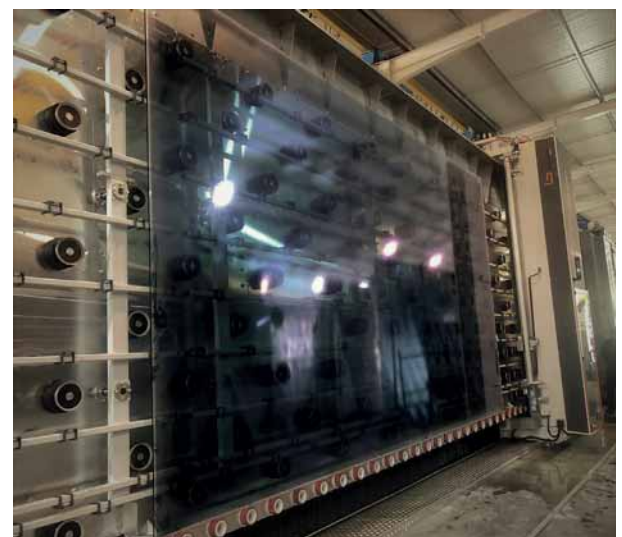
Processing of big glass sheets in a limited space thanks to the compact system that integrates the loading and unloading in a single solution.

The machine's suction cups have a locking system that involves the entire glass sheet.

Other features include:

- Maximum precision machining
- Best tool efficiency
- Loading of new glass sheets during the production cycle.

Available in different sizes 2.0.3 - 2.5.4 - 3.2.5 - 3.2.6 - 3.2.9



bestmakina



BEST MAKINA SAN. VE TIC. A.S.

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COMPANY DATA

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Founding Year

1999

Office

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Tel.: +49-1511-7772378
E-mail: holger.boehme@bestmaschinenbau.de

Area

22000 m²

Number of Employees

200

Planned Exhibitions 2024

Glasstec - Düsseldorf, Germany - 22 / 25 October
Eurasia Glass - Istanbul, Turkey - 16 / 19 November

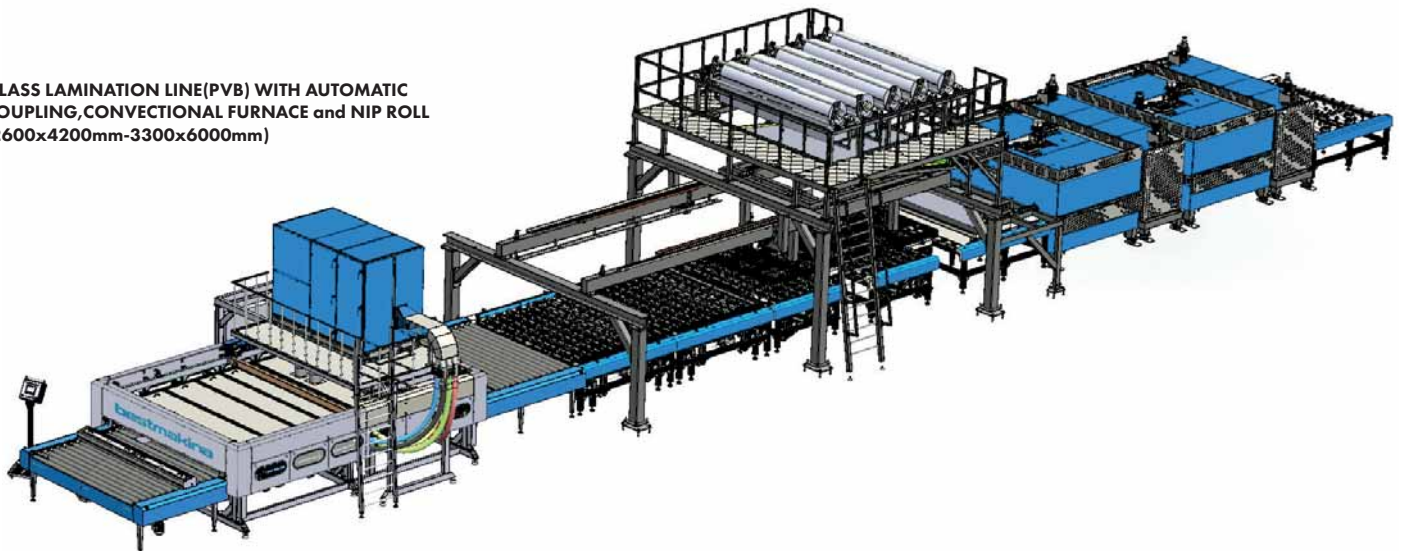
COMPANY PROFILE

BEST MAKINA has been providing customized solutions for insulated glass production companies since 1999. With the advantage of having all engineering and production phases in-house; BEST MAKINA can create and deliver flexible solutions with the best price-performance ratio.

BEST MAKINA grants a longer lifetime as well as simplicity and durability of the machine components. BEST MAKINA offers excellent after-sales service including same-day parts supply, remote assistance, and 2 years warranty period. BEST MAKINA has the best return on investment parameters through the sustainable quality, performance of the machines and services.

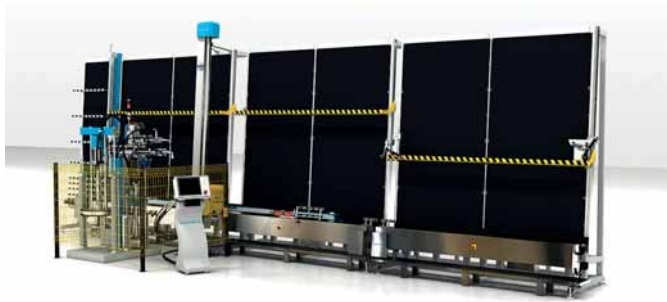


GLASS LAMINATION LINE(PVB) WITH AUTOMATIC COUPLING, CONVECTIONAL FURNACE and NIP ROLL (2600x4200mm-3300x6000mm)





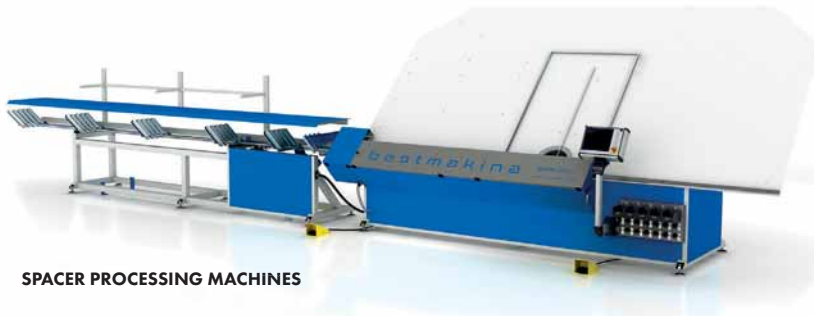
INSULATED GLASS PRODUCTION LINES (H:1700-3300mm)



AUTOMATIC TWO COMPONENT EXTRUDERS(H:1700-3300mm)



VERTICAL ARRISING LINES(H:1700-3300mm)



SPACER PROCESSING MACHINES

AUXILIARY EQUIPMENTS



PRODUCT RANGE

- GAS FILLING OR NON-GAS FILLING INSULATED AND STEPPED GLASS PRODUCTION LINES(1700X3000MM TO 3300X6000MM)
- VERTICAL & HORIZONTAL WASHING LINES(1700X3000MM TO 3300X∞)
- AUTOMATIC TWO COMPONENT EXTRUDERS FOR SECONDARY SEALING(1700X3000MM TO 3300X6000MM)
- GLASS LAMINATION LINE
- VERTICAL ARRISING LINES(1700X3000MM TO 3300X6000MM)
- COATING (LOW-E) DELETION MACHINES(1700X3000MM TO 3300X6000MM)
- MANUAL TWO COMPONENT EXTRUDERS FOR SECONDARY SEALING
- PIB EXTRUDERS
- AUTOMATIC SPACER BAR PROCESSING MACHINES
- MANUALLY OPERATED SPACER BAR PROCESSING MACHINES
- AUTOMATIC TRANSFER SOLUTIONS FOR I4.0 APPLICATIONS



Biesse

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Founding Year

1969

Number of Employees

4,000

COMPANY PROFILE

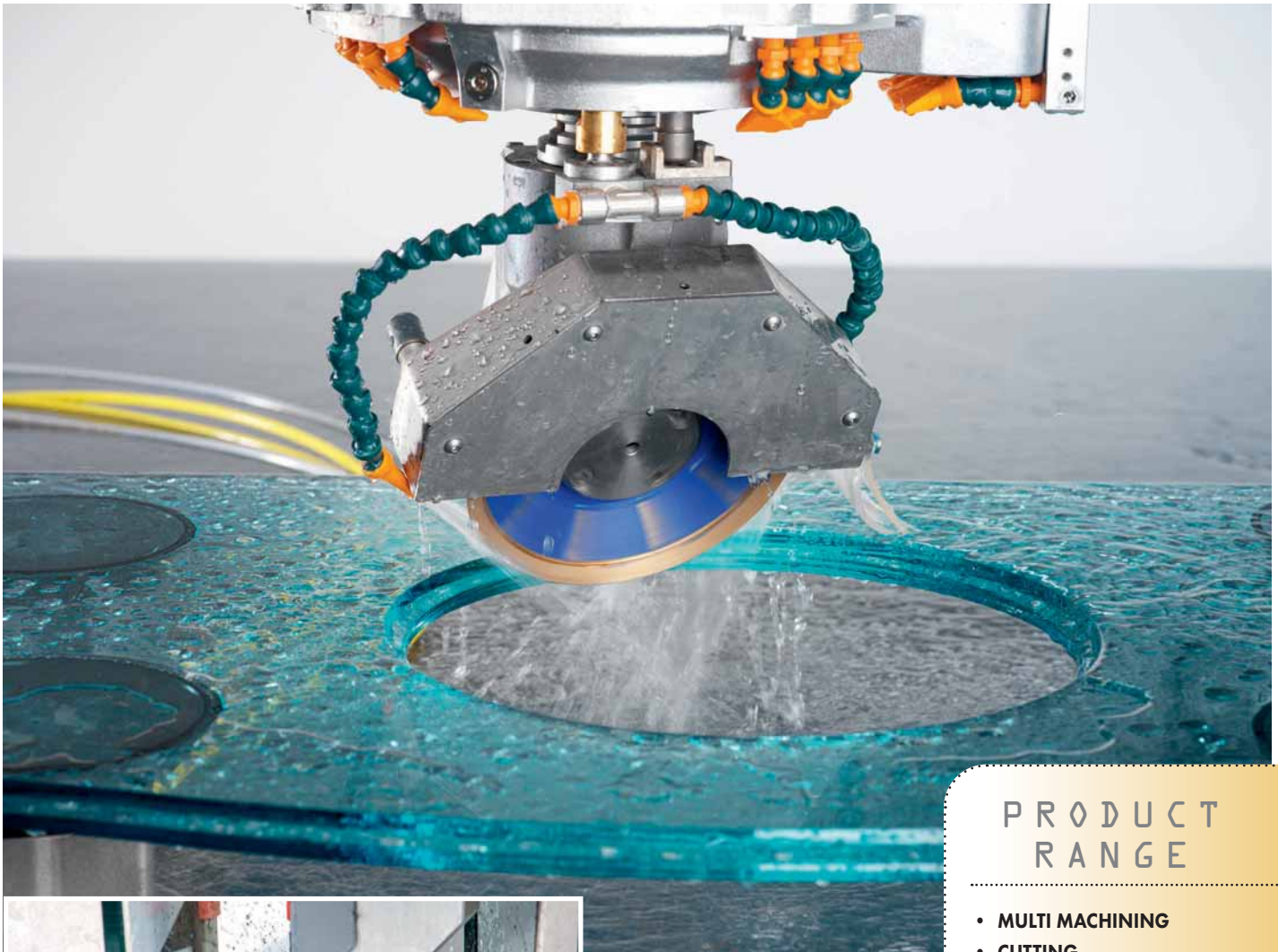
BIESSE is an international company that manufactures integrated lines and machines to process wood, glass, stone, plastic and composite materials.

Founded in Italy in 1969 and listed in the Euronext STAR segment of the Italian Stock Exchange, Biesse supports the business evolution of its customers in the furniture, housing & construction, automotive and aerospace sectors.

Today, about 80% of the consolidated turnover is achieved abroad by an ever-growing global network with 4 manufacturing campuses and 30+ showrooms all over the world.

Thanks to its rooted competence embodied by 4.300 employees, Biesse empowers the imagination of industry leading companies and prestigious names in Italian and international design to make the potential of any material shine.

To find out more about Biesse sales network visit biesse.com



PRODUCT RANGE

- MULTI MACHINING
- CUTTING
- EDGING
- DRILLING
- FINISHING





BOTTERO SpA

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COMPANY DATA

Contacts

Alberto Masoero - Flat Glass Sales Manager
Paolo Mazzone - Hollow Glass Sales Manager

Annual turnover of the company

Over 300Mio Euro

Percentage of turnover from glass (%)

80

Sales

Domestic 10% / International 90%

Quality certification

ISO9001 - ISO14001 - ISO26000

Area

Plant area 44,000 m²

Number of Employees

650

Founding Year

1957

Capital

EUR 6,000,000

Patents obtained

110

Registered brands

4



SALES NETWORK

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COMPANY PROFILE



The glass industry has undergone a global transformation in recent times. Glassworks are facing a much more variable request from the market: dimensions and order size are difficult to predict, while delivery times are becoming shorter and shorter.

The new challenge for glass makers is to keep pace, raising productivity and staying competitive. This means investing in new equipment, but mainly reshaping the workshop production flow following lean principles.

Bottero S.p.A. has solutions ready to go for all these challenges, based on three main pillars:

- modular machines and platform concept;
- integrated systems tailor-made to customer needs;
- Bottero 4.0: a comprehensive suite for machine learning and artificial intelligence.

For more than 60 years Bottero has been leading the flat glass industry in float and laminated glass with an in-depth and wide range of processing machines, from cutting tables to double edgers and CNC machines.

With more than 200 glass production equipment items, and more than 50,000 processing machines installed around the world for any type of glass, Bottero is the unmissable partner for everyone who wants to cut a piece of glass.

Our product range in cutting (BKM, BCS and EVO) is the widest and most in-depth available today in both stand-alone and dual-line with a laminated glass cutting table, or within an integrated line with stock management systems such as crane loaders or shuttle systems.

Thanks to their modular design, our customers can choose several options for their cutting tables, such as the Easy Deletion system

with baffle grinding wheel, low-E/TPF removal with peripheral grinding wheel, PPL labelling printer and CO2 laser marking, just to name a few.

Every Bottero cutting table gathers more than six decades of experience and know-how in the glass sector, ensuring not only perfect cutting quality and a user-friendly approach, but also remote support and preventive maintenance tools.

Bottero offers a wide range of solutions for laminated glass processing scalable in terms of modularity and automation level, suitable to process laminated glass with PVB (acoustic and/or refrigerated), EVA and special anti-hurricane interlayers.

Bottero's R&D department is continuously working to innovate its laminated glass product range to ensure that the company remains the undisputed leader in this field.

The company's most advanced equipment is the 548 LAM, a fully automated table that can process different laminated glass types with reduced cycle time and energy consumption.

Thanks to a great number of patents, Bottero's PVB heating system focuses energy on the PVB without heating the glass, thus reducing cycle time by 30%, saving up to 40% of energy costs and reducing the number of glass breakages.

Operator manual intervention is eliminated thanks to the patented squaring device for glass positioning and rotating, as well as by means of automatic loading and unloading arms.

With regards to laminated glass production, Bottero is currently market leader in the assembly line segment with a full range of solutions ranging from entry level, with manual loading and unloading, up to fully automated with automatic PVB unwinding and trimming with an output cycle time of 38s per JS plate of up to 6,000x3,300mm.

Bottero Flex Lamelines can manage shaped glass from 200x200mm up to XJS glass of 12,000x3,300mm in multiple layers of up to 100mm thickness.

Thanks to a great number of patents and more than 25 years of experience worldwide, Bottero offers state-of-the-art nip rolls and furnace area for laminated glass production, suitable for a huge variety of glass size and dimensions. Modularity and scalability are also applied to Bottero's wide range of horizontal double edgers and vertical edgers. While double edgers represent the best solution when high grinding and polishing quality is required, vertical edgers are more flexible and can be easily integrated with robots for loading, unloading and glass rotation.

Of course, double edgers ensure perfect parallelism, squareness and multiple profile finishing, including arrisses, engraving and polished radius corners. With Bottero new Flex Edge, customers can really customise their machines with up to 17 spindles per side, with an unlimited range of dimensions up to 12,000mm opening width. Remote service, cloud connection and preventive maintenance tools are the basic tool set of Bottero edgers.

Bottero is, and has been since 1957, customer centric. Our Pre-Sales and Sales Department pay special attention to understand customer expectations and limitation to develop the best proposal fitting with customer needs and reducing Total Cost of Ownership (TCO).

Fewer manual operations and more automation has allowed many of our customers around the world to improve their competitiveness and market leadership.

bovone

MADE IN EXCELLENCE

BOVONE Srl

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COMPANY DATA

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Matteo Patalocchi**
Sales Manager

Annual Group Turnover

EUR 18 million

Percentage of Turnover from glass (%)

95

Sales

Domestic (2%) / International (98%)

Quality Certifications

ISO 9001 - ISO 14000 - ISO 18000 - ISO 45001

Nominal Capital

EUR 1 million

Area

Offices 1,000 m² / Plants 12,000 m²

Number of Employees

110

Founding Year

1954

Registered Trademarks

Bovone

Parent and Sister Companies

BDT - Bovone Diamond Tools

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Planned Exhibitions 2024

China Glass - Shanghai, China - 25 / 28 April
GlassBuild America - Dallas, USA - 30 Sept. / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October
BIG5 - Dubai, UAE - 26 / 29 November

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ykcltd@ykc.co.kr

CYPRUS

CORPOTRADE (Cyprus)Ltd.
charlesmaalouf@corpotrade.com





Innovation and Customization, Flexibility and Reliability, Performance, Quality and Process Speed are the characteristics of each Bovone product. Over 65 years of production at the highest levels, Bovone Group has established itself as an international leader in the supply of stand alone machines and full-line systems, accessories and tools for the second processing of glass and natural and synthetic stones.

The continuous analysis of the different and frenetic trends of each single application market originates the technological primacy of Bovone Group, which constantly studies new solutions that are able to provide clients with cutting-edge technologies for present and future challenges. In fact BRS, the Bovone robotic systems, born well in advance of the other players, expresses the trends of a market that is increasingly looking for automated solutions, to optimize resources without losing sight of workmanship quality. Highly technological solutions for application destinations mainly aimed at the construction, furniture and automotive sectors: the entire production takes place in the Ovada (AL) plants, which constitute an infrastructure of absolute excellence in the Italian and international industrial scene - all able to internally manage every step, from supply of the best raw materials to development and integration of management software, up to proposal of the most suitable tool, thanks to the synergy with its subsidiary BDT, Bovone Diamond Tools.

In addition to the Ovada headquarters, Bovone is present in the market with two direct branches, one in the United States dedicated to the North American market, the other in Brazil for coverage of South America, as well as a widespread network of distributors present throughout the world. An articulated and highly qualified system of technicians, supported by the almost unlimited availability of stock, provides an excellent after-sales assistance service, that responds promptly and competently in each geographical area.

On the commercial side, the choices that are building this strategy are the result of a clear and defined vision of business objectives: starting from 2020, the new headquarters in the United States



originates from this vision and is aimed at direct control of the market. The new General Manager who will lead the US office is called to consolidate the presence of the brand on such a strategic market as that of the US which continues to show real interest in Made in Italy technology. The action plan involves the structuring of an excellent sales service – faster responses and more efficient sales support – and the development of new opportunities.

Anticipating market needs and facing high production standards are the drivers that guide production choices:

Bovone machines and systems combine high quality with process speed, the continuous innovative drive with a drastic reduction of downtime thanks to very high reliability.

There are three production reference areas at Bovone:

Machines

Stand alone machines for the treatment of glass sheets: grinders, bevellers and washing machines. The main aspect of this area is its high level of customization which, today, is a fundamental strategic plus: whether it's Bovone machines are designed to solve each and every production need. They provide perfect finishes for increasing production results thanks to their high speed, and combine the most advanced electronic applications with the construction strength and reliability guaranteed over time: an entry level machine or a more advanced model, Bovone is able to guarantee excellent performance.



Plants

Complete systems for mirror silvering and laminated glass lines are fully customizable and can be integrated according to clients' specific needs: with respect to standard configurations, all construction details are customized and calibrated to meet every specific need. Bovone systems ensure high performance both for large numbers and for those where high flexibility is required.

BRS – Bovone Robotic System

Within the BRS area the production range also includes, fully automated Bovone robotic systems for grinding glass. The BRS integrates straight-line edging machines and articulated, multi-axis robots with different loading and application capacities. And, with regards to the field of applied industrial robotics, BOVONE is Kuka's Official System Partner. BRS conforms perfectly to Industry 4.0 protocols: islands work without the presence



of personnel and are fully connectable for the traceability and self-adjustment of all production parameters.



CMS SpA

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COMPANY DATA

Contacts

Carlo Propersi - Division Manager Glass,
Stone and Metal

Luca Barbieri - Business Unit Manager Glass

Alessandro Colella - Product Manager Glass

Mother Company

SCM GROUP

Annual Company Turnover

EUR 150 million

Number of Employees

700

Founding Year

1969

Parent and Sister Companies

1) CMS NORTH AMERICA

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Tel.: +1 616 698 9970 - E-mail: cmssales@cmsna.com

2) CMS FRANCE

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Tel.: +33 450 028 391 - E-mail: commercial@cmsfr.fr

Planned Exhibitions 2024

GlassBuild America

Dallas, USA - 30 September / 2 October

Glasstec

Düsseldorf, Germany - 22 / 25 October

COMPANY PROFILE

CMS Glass Technology: high-performance machining centers and unique integrated lines for glass processing

CMS Glass Technology is an industry leader in the field of bent and flat glass working, with advanced solutions such as horizontal and vertical CNC machining centers, cutting tables, seaming machine and waterjet cutting systems.

CMS has just expanded its product range with the new:

- ELECTA and TAKTIKA machining centers
- AURA and PROXIMA dry seaming machines
- AGIL TR cutting table.

ELECTA is the new 3- or 4-axis CNC machining center for processing flat glass, whether thick, thin, float or laminated. In its category CMS electa features an incredibly compact footprint with an ultra-wide working area and can perform many types of machining: the 3-axis version performs grinding, edge polishing, drilling and milling, while the 4-axis version can also perform cup wheel polishing, diamond disc cutting, engraving and 5° bevelling.

The high inertia and thickness of the exclusive Metal Synthetic Technology (MST) worktable, which replaces the conventional aluminum worktable, dampens vibrations and helps to improve the quality of the machined glass.

With a maximum axis speed of 72 m/min, CMS electa guarantees top performance and is the perfect machine to increase pro-



ductivity since it performs high-speed grinding and can machine multiple work-pieces on the same worktable.

TAKTIKA is the compact vertical machining center developed by CMS for the greatest flexibility in small spaces. It can perform seaming, grinding, polishing, milling and coaxial drilling; it can be used stand-alone or in line with a vertical washing machine to wash the glass immediately after processing.

The project was conceived for small and medium-sized glass factories that need to increase their efficiency, and is also ideal for larger companies that need the flexibility to manage small batches of glass.

Taktika features the new Cms Active software was designed to make the user interface more efficient and user-friendly than ever.



AURA is the vertical dry seaming machine specially developed to machine edges without the use of water (dry seaming). Aura can be used as a stand-alone machine, in line with a vertical washing machine and is the perfect machine to be part of a double glazing production.

Aura can seam monolithic, laminated or low-e treated glass. Aura is designed to meet the needs of customers who demand ease of use, quick installation, reliability and low cost of system ownership.



PROXIMA is an automatic horizontal dry seaming machine and it is the ideal solution for all small-medium glass factories that need to venture into seaming with a modest investment. This machine has been designed to be combined with both tilting float glass cutting tables and laminated glass cutting tables.



AGIL TR is a super compact, versatile and easy to install cutting table. It automatically cuts float glass sheets and semi-automatically cuts laminated glass sheets, thanks to the double-zero system. Agil tr can process sheets up to 3810x2600 mm, has 4

loading / unloading arms and a C-axis for straight and shaped cutting.

It can optionally be equipped with an automatic tool changer, a grinding wheel for removing low-e coatings, and a cutter for vinyl removal.



CMS's product-range also includes:

- GEA and SPEED: horizontal 3- and 4-axis horizontal CNCs with bigger worktables than Electa
- MAXIMA: 5-axis horizontal CNC for bent glass and beveling without templates or with a variable angle
- YPSOS and VERTECMILL: vertical CNCs dedicated to the edge- and internal-processing. They can be put in line to reach the highest productivities
- EASYLINE, SMARTLINE, PROLINE and AQUATEC: a wide range of 3- and 5-axis abrasive waterjet machines to cut, drill and mill monolithic and laminated glass, either thin or thick.

CMS can also design and manufacture tailor-made, fully-automatic cells and lines based on customer's needs in terms of space and productivity.

To keep up with the continuous evolution of the manufacturing world and **Industry 4.0**, CMS has also introduced **new digital applications and services to simplify the operator's daily operations and management of the entire production process.**

The digital services offered by CMS include **CMS CONNECT**, the IOT platform that is fully integrated with CMS machines. It can offer customized micro services through the use of IoT Apps that support the daily activities of industry operators, improving the availability and use of machines or systems. The platform displays, analyzes and monitors all data from connected machines. The data collected by the machines in real time can be used to increase machine productivity, reduce operating and maintenance costs and cut energy costs.

CMS has also decided to adopt the new **CMS ACTIVE** software for all its machines. It is an extremely simple, user-friendly human machine interface (HMI) so that the operator can easily manage each process. In addition, the operator can quickly get used to different Cms machines because they all have Cms Active with the same look & feel, icons and approach to interaction.

All CMS Glass Technology machines are also equipped with a free remote support program, which allows the operator to connect with CMS support to be guided step by step through troubleshooting any issues.



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Contacts

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Silvia Viva - Sales Account

Mother Company

Cugher Glass srl

Annual Company Turnover

EUR 15,000,000

Percentage of turnover from glass (%)

95

Sales

Domestic 5% / International 95%

Quality certifications

ISO 9001

Area

Office area 1,000 m² / Plant area 7,600 m²

Number of Employees

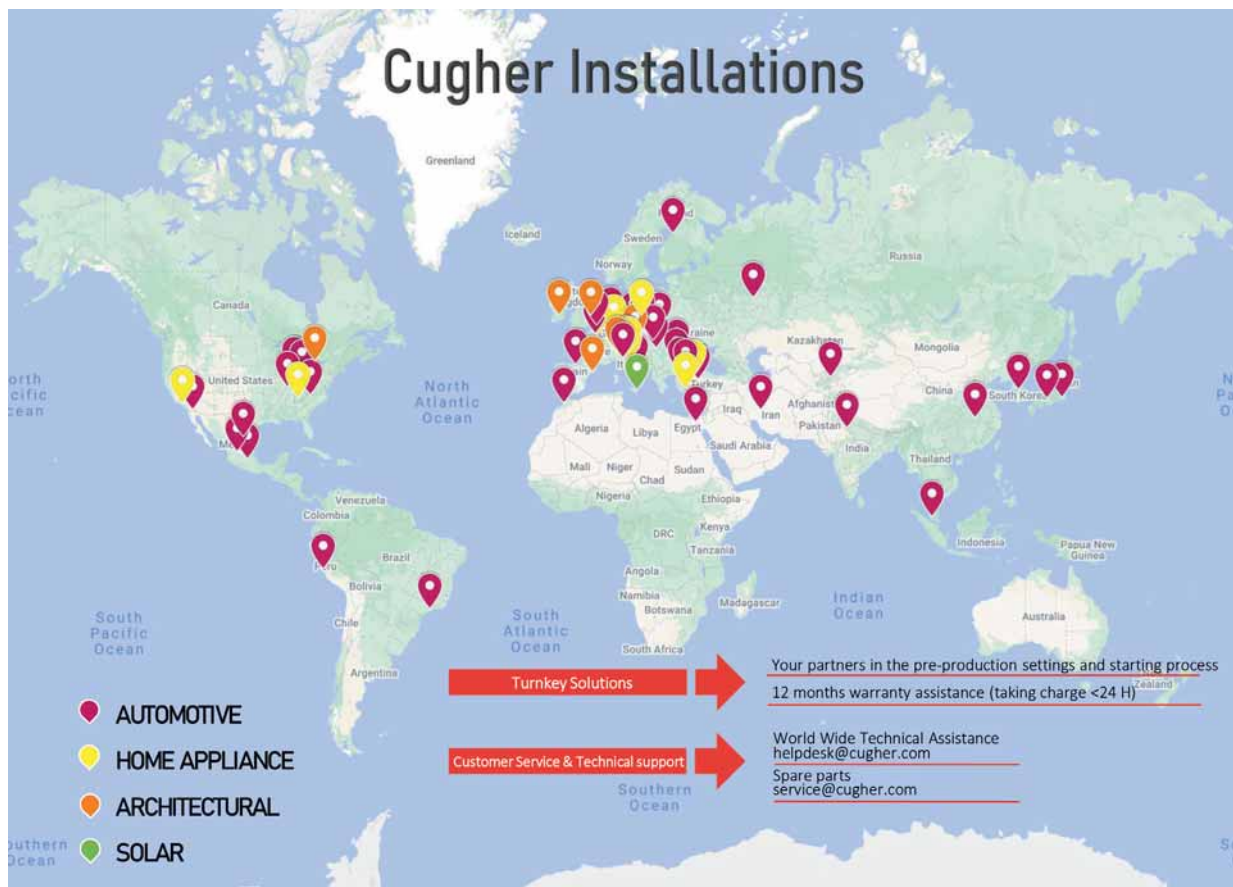
130

Founding Year

1967

Planned Exhibitions 2024

China Glass - Shanghai, China - 25 / 28 April
Intersolar Europe - Munich, Germany - 19 / 21 June
GlassBuild America - Dallas, USA - 30 September / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October





PERFORMANCES DRIVING to the FUTURE

when excellence is needed
for Glazing Technology

COMPANY PROFILE

Cugher's over 50-year success with printing machines for silk-screen printing on glass is the result of an efficient mix of productive resources and cutting-edge technologies, deriving from the work of a team of high profile professional and derives from the work of a Team composed by high profile professionals. Production focuses on offering customized and performing solutions for each sector.

AUTOMOTIVE

Fully automated and integrated printing lines for tempered and laminated glasses of windshields, backlites, sidelites and rooftops. The plants guarantee extremely high productivity, print repeatability ($\pm 0,08$ mm) and short cycle time (from 6 to 15 seconds).

HOME APPLIANCE

Solutions for a sector where speed is essential. The production change-over is very simple and fast; it allows for very easy processing of different glass types, with operations relative to different batches all performed by a single operator.

BUILDING & INTERIOR DESIGN

Architectural LAB, the newest research center, is highly specialized in the creation of specific long-term solutions to manage float, tempered, laminated glasses of civil and industrial applications – from windows and balconies to furnishing elements and shower enclosures.

SOLAR

Development and engineering of machinery for handling solar panels along the production line as well as silk-screen printing of backsheets – all guaranteeing wet film uniformity, 98% good parts, a 7/7 working plant and high reliability.

Cugher's commercial offer is dedicated to a cutting edge product range composed of:

- **Machines for screen printing** that best fit production needs thanks to options ensuring excellent image definition, precision and uniformity of the ink. Cugher printing machines can either be integrated in a turnkey automated plant or used stand-alone with a high level of flexibility.
- **Dryers (IR, UV or combined)** with specific features and flexibility to satisfy both silk screen printing and digital printing on glass. Indeed, adapting air recirculation, dryers can accurately dry ink thicknesses from 15 to 100 microns.
- **Vision systems and quality control** provides opportunities to best control glass and print quality in every detail and to monitor and adjust the process through optical systems that are designed for automatic screen centering automatic control of broken screens.
- **Dedicated systems for handling, transport and storage** of every dimension and shape, guaranteeing excellent integration and synchronization with all line components.



DELTAMAX AUTOMAZIONE Srl

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COMPANY DATA

Contacts

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Fulvio Rigotti - President
Gianluca Diener - Sales Manager

Mother Company

Delta Informatica Spa

Annual Group Turnover

EUR 25.000.000

Annual Company Turnover

EUR 2.000.000

Percentage of turnover form glass (%)

100%

Sales

National 35% / International 65%

Number of Employees

15

Founding Year

1989

COMPANY PROFILE

Born in 1989 as spin-off of the research centre Fondazione Bruno Kessler, **DELTAMAX** boasts wide experience in the development of **artificial vision solutions for quality control** in the industrial sector. Since 2010 we have devoted to flat glass quality control developing cutting-edge solutions thanks to continuous investment in Research&Development.

Since 2017 Deltamax has become part of the Delta Informatica group, a point of reference for ICT in the north of Italy. The common goal is to support the continuous growth of the inspection solutions application, with a more structured organization ready to face the new challenges that the markets propose.

Thanks to the strength of the group and to our thirty year experience, we can offer the necessary know how to renovate the manufacturing process, with hard-core solutions aimed at modernizing existing systems, replacing or integrating them with more innovative ones.



CUTTING LINES SOLUTIONS

The complex production of float glass involves the presence of structural defects in every sheet, defects that cannot be repaired. This results in significant costs that relate to waste management and client disputes. With a mission to make the whole float glass transformation process more efficient, Deltamax has developed OPT, the innovative solution destined to change the glass sector. It can detect defects before each processing without having to wash the sheets and guarantees numerous advantages and a quick return on investment.

IG LINES SOLUTIONS

The high demand for insulated glass by the building industry with increasingly larger, high-performance windows in terms of acoustic and thermal insulation has resulted in demand for higher quality, as close as possible to a "zero defect" result. Being the first company ever to engineer a functional solution for defects control in IG lines as well as the first designer of a scanner for defects detection such as halos, Deltamax is now a leader in the supply of technologies for supporting workers, such as augmented reality.

• **GLASSINSPECTOR**

Developed in 2007, this technology has constantly evolved to meet different needs, ensuring the detection of the typical glass defects such as bubbles, inclusions, scratches, coating defects, dirtiness, etc.

• **Q+**

Q+ integrates two different technologies of inspection in one solution: the standard system potential is improved by a second inspection channel which dramatically increases the capacity to detect superficial defects, such as halos

• **IGU SCANNER**

Any manufacturing company's goal is to certify the quality of a finished product and of the whole production line before delivering it to the client. Thanks to the IGU Scanner, Delta-max can offer a versatile solution for the control of single, double and triple glazing

FLAT GLASS CONTROL SOLUTIONS

The increasing speed in modern manufacturing systems makes the use of technology indispensable to ensure accuracy in the single production processes and the quality of the finished product.

This is no less true for flat glass production and processing lines. The level of automation has considerably increased over the years, thanks to the technological innovations which guarantee high performance together with simplified configuration and use.

That is the case of EVO, the most flexible and comprehensive solution for flat glass inspection which be easily adapted to any production line to carry out accurate controls which can even be combined one with the other. These controls include:

- DEFECTS DETECTION
- PRINTING CONTROL
- DIMENSIONAL AND SHAPE CONTROL





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Johann Artamonov

Managing Director Edgetech Europe GmbH

Mother company

Quanex Building Products Corporation

Area

Cambridge, Ohio - USA: 38,740 m²

Heinsberg, Germany: 4,368 m²

Coventry, UK: 2,522 m²

Number of Employees

490

Founding Year

1989

Registered brands

Super Spacer®

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Super Spacer® warm edge for greater energy efficiency in Buildings

Emission-reducing thermal insulation and solar control glazing are more important than ever due to climate-related rising temperatures and high energy prices.

By considerably reducing the energy loss at the edge seal, warm edge spacer systems like Super Spacer® additionally contribute to the energy efficiency of glass facades. Large glazing specialists further benefit from increased productivity in the automated production of double and triple glazing, and in particular, from the parallelism of the spacer even within large sealed units.



The structure of the edge seal

Spacers must be resistant to wind and climate loads, UV radiation, temperature as well as mechanical stress and form a permanent bond with the respective sealants such as Polyurethanes, hot-melt butyl or silicone. Gas must not be allowed to escape from the interior, nor must moisture be allowed to penetrate through the edge seal to the inside of the insulating glass, and last but not least, the edge seal is also responsible for ensuring the structural integrity of glass constructions in the facade.

Super Spacer® structural silicone foam design makes the edge seal flexible, helping to absorb the pressure on it and therefore risk of breakage for the glass is significantly reduced. Less stress in the edge seal results in an improved seal tightness and durability of the glass units. The full or partial offsetting of the loads acting on the edge seal is an advantage that especially desiccant integrated pre-formed flexible spacers, such as Super Spacer® can claim to possess by comparison for example with rigid spacers.



Super Spacer® warm edge for thermally optimized facades

In the construction and building industry, ESG criteria are becoming increasingly important - first and foremost, of course, with regard to the first letter E, which stands for Environment. A warm edge spacer such as Super Spacer® is the simplest means of thermally optimizing insulating glass units, because the conductivity of the spacer in the edge seal is one of the decisive factors for the thermal insulation values of a window or a glass pane. A rule of thumb states that a difference of 0.04 W/mK in the length-related thermal transmittance Psi is equivalent to an improvement of 0.1 W/m²K in the Uw value. Super Spacer® achieves a Psi value of up to 0.029 W/mK, making it one of the most energy-efficient spacers on the market.



Planned Exhibitions 2024

We value direct contact with our clients, that is why we will try to attend as many trade fairs as possible.

ZAK World of Facades - Bengaluru (India) - 01 March
fensterbau FRONTALE - Nuremberg (Germany) - 19 / 22 March
Hearth, Patio & Barbecue Expo - Nashville, TN (USA) - 13 / 15 February
ZAK World of Facades - (Dubai) 23/24 April

GlassBuild America - Dallas, TX (USA) - 30 September / 2 October
glasstec - Düsseldorf (Germany) - 22 / 25 October
Windoor North America - Montreal, QC (Canada) - 13 / 14 November
BAU - Munich (Germany) - 13 / 17 January 2025

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COMPANY PROFILE

FOREL, established in 1976, is an Italian company of solutions for flat glass and double-glazing processing (vertical cutting, sorting systems, edge processing line, laminating glass lines and IG line). Forel has its headquarters and production plants in Italy, but the company owns commercial branches and offices in USA, Canada, United Kingdom, South Africa. The sales network is worldwide present and has developed sales relations with over 70 countries, exporting the technological tradition and dynamism of Italian engineering. Forel's core philosophy is innovation: every year, a remarkable part of the incomes are invested in R&D.





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COMPANY DATA

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Stefano Tibè - Sales Manager

COMPANY PROFILE

GIARDINA GROUP – 70 employees, a turnover of around 20 million euros and 95% of exports – is a world leader in technologies for painting glass, wood, composite materials, plastic and metal.

It was born from the merger of Mauri Macchine and Giardina Finishing, companies founded in the early seventies, and from the very recent acquisition of De Stefani, all companies that have been protagonists for decades in the various sectors of surface finishing. Skills, professionalism and experience that since 2017 have been brought together in a single, large technological hub in Figino Serenza, in the province of Como, where the largest production program in the sector is designed and implemented:

from the treatment of glass plates "Jumbo" to the impregnation of the beams, from the finishing of the profiles to sophisticated robot plants for the painting of doors and windows or furniture. A 360-degree experience which – through the work of Giardina Group Glass Division – has made it possible to develop specific solutions, with strong innovative contents, also for the world of glass.

A vocation that since 2019 can count on the structures of the Giampiero Mauri Innovation Center a large, well-equipped showroom/laboratory - named after the founder of the group - where customers and partners can test all the available technologies.

For the glass sector Giardina Group Glass Division offers:

- Heavy-duty Roller Coaters suitable for lacquer application on glass (standard working widths from mm 1,300 to 2,500; wider machines on request);
- Roller Coaters for special glass decoration;



- Automatic Spray machines, either with disposable paper belt conveyor or with paint recovery belt;
- Curtain coaters with double bed and 1 or 2 coating heads on fix or removable trolleys;
- 3D Glass Finishing with combined systems MOS® IR for water-based products;
- Quick drying systems such as MOS® UV dryers;
- Flash-offs and hot air tunnels;
- Cooling tunnels.

In recent years, Giardina Group Gass Division has further perfected its drying and preheating technologies, capable of fur-

ther optimizing cycles for high productions and offering an important added value in terms of efficiency, energy saving and sustainability. The new ovens allow to manage the preheating of several glasses at the same time, leading to a homogeneous temperature in the glass, with important energy saving factors and quality of subsequent processing.

The mixed IR and forced air drying systems guarantee superior performance compared to the ovens in use today in the mirror sector, just as the lateral radiation of the glass guarantees total drying of the coating at every point.



PRODUCT RANGE

- ENAMELLING EQUIPMENT AND PLANTS
- HOT AND COLD COATING SYSTEMS AND MATERIALS (ROLLERS, CURTAIN COATERS, DRYERS)
- POWDER OR LIQUID APPLICATION SYSTEMS FOR PROTECTING FLOAT GLASS

GLASSCOMPANY



GLASS COMPANY Srl

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COMPANY DATA

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Claudio Bernabucci - CEO

Annual turnover of the Company

EUR 4,000,000

Sales

International > 70%

Banks

BPER - CREDEM - Banco BPM

Area

Offices 250 m² / Plants 1000 m²

Number of Employees

9

Third-party suppliers

Pesaro area, as well as international suppliers

Planned Exhibitions 2024

Glasstech Mexico

Guadalajara, Mexico - 09 / 11 July

GlassBuild America

Dallas, USA - 30 September / 02 October

Glasstec

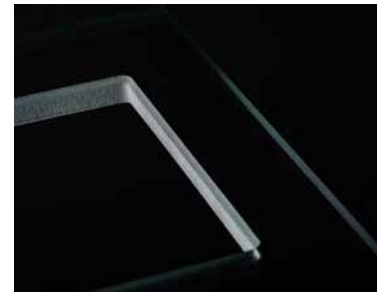
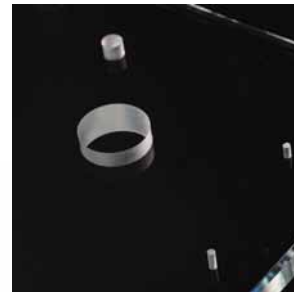
Düsseldorf, Germany - 22 / 25 October

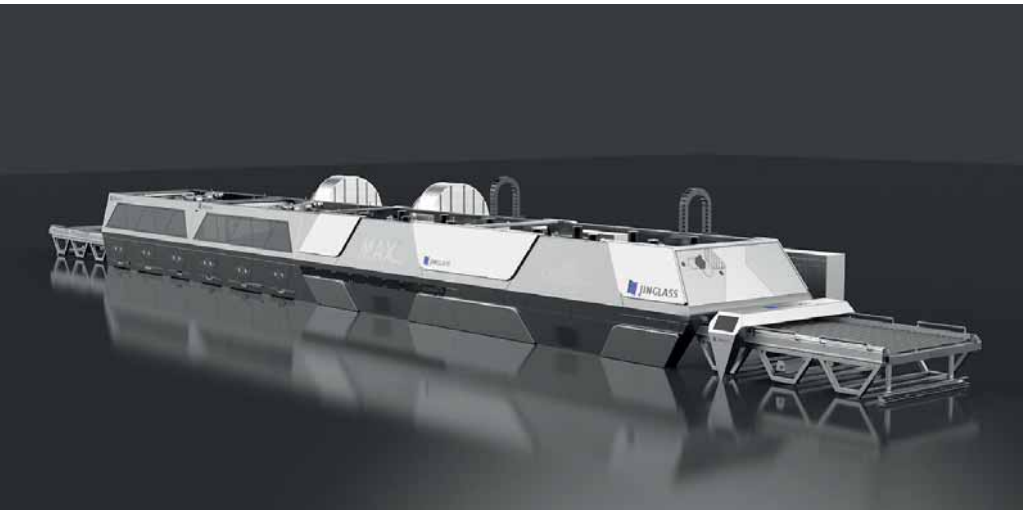
BIG 5 - Gulf Glass

Dubai, UAE - 26 / 29 November

PRODUCT RANGE

- Laser cutting, drilling, engraving and ablating machines
- Fire resistant glass production systems
- Flat and bent glass tempering furnace
- Vertical and horizontal washing machines
- Laminating furnaces and turnkey plants
- Glass coating systems
- IG Lines





high processing speed. Particular interest has been addressed to the Low-E coating engraving, to produce heating glass for refrigeration sector and for any other sector where anti-fog glass are required, thanks even to a dedicated software HG SoftMek for the automatic calculation of the coating cutting to determine the glass temperature.

Also LaserMek has been expanding with a **DRILLING** Laser which allows to obtain even notches and grooves on the glass edge. The drilling can be of any shape starting from the classic round hole to holes of any geometry (oval, rectangular, trapezoidal, etc.) with a maximum size of 80x80mm which can reach

COMPANY PROFILE

Founded in 2001 thanks to more than 30 years experience of its owner Claudio Bernabucci and the continuous research and development in innovative products **GLASS COMPANY** has become one of the leading companies in Italy for special glass processing machines and equipment.

Glass Company designed plants are equipped with highly advanced technology and receive extremely positive feedback from the sector.

For the research and innovation purposes Glass Company has introduced **GlassMek division**:

- **LASERMEK**, a highly-configurable modular machine for the laser engraving and ablation of any type of coating and silvering on glass. The machine has been improved with Scanner technology which allows to engrave paint or coating leaving the glass surface completely transparent, with a very

100x100mm by using very sophisticated optics.

Thanks to a Laser source advanced technology and a dedicated software various solutions have been developed for **CUTTING** monolithic glass up to 25mm thickness. The cut is perfect and without chipping and is suitable for tempering the glass

- **FIREMEK**, is an automated turnkey system designed to Fire-resistant glass production. Particularly appreciated for its ease of use and affordable price which makes **E**, **EW** and **EI** glass production not only the prerogative of a few producers, but even of small and medium firms.
- **PLASMEK**, an innovative technology, created thanks to Glass Company's experience, uses atmospheric pressure plasma for cleaning and treatment of flat glass surface, increasing the adhesion of the applied products in the immediate subsequent stages of processing.

Glass Company Srl has been continuing for over 15 years its collaboration with Jinglass for flat and bent glass Tempering furnaces supplying with very high technology plants such as the new glass tempering furnace VULCAN

Also Glass Company has been collaborating with HANJIANG since 2022 to supply the full automatic IG Lines

Not at last Glass Company directly supply assistance and technical advice from Italy to give customers a quick response to their needs with the high professionalism already known in the glass field.





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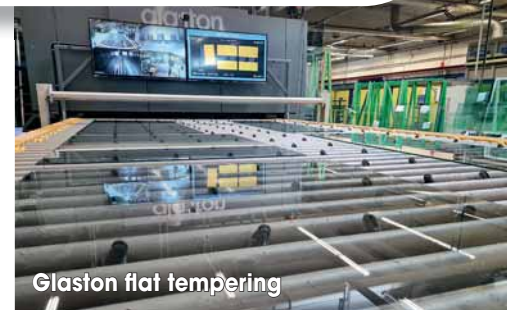
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Annual Group Turnover

EUR 213,5 million

Number of Employees

780

Registered Patents

257

Planned Exhibitions

Glaston will be present at major glass exhibitions in 2024

COMPANY PROFILE

Glaston in brief

Glaston is the glass processing industry's innovative technology leader supplying equipment, services and solutions to the architectural, mobility, display and solar industries. The company also supports the development of new technologies integrating intelligence into glass. Glaston is committed to providing its clients with both the best know-how and the latest technologies in glass processing, with the purpose of building a better tomorrow through safer, smarter, and more energy-efficient glass solutions. Glaston operates globally with manufacturing, services and sales offices in 9 countries and its shares (GLA1V) are listed on NASDAQ Helsinki Ltd.

NEW DIGITAL SOLUTIONS ENABLE BETTER BUSINESS

Digital solutions have always been – and continue to be – integral to the machinery and services we provide. They allow our customers to fully prepare for the future by generating significant business value. At Glaston, we keep investing in our digital capabilities to keep pace with the latest technological developments, such as the cloud, automation, remote connectivity, and big data.



Glass heat treatment

Bringing you built-in intelligence with our machinery has been our core focus for quite some time. The latest versions of Glaston flat glass tempering furnaces **Glaston FC Series, RC Series** and **Jumbo Series** incorporate high levels of automation and intelligent process control. Some of the latest innovations in the automation of the flat tempering process are the online fragmentation prediction for every glass and the white haze detection using Artificial Intelligence (AI). The **tempering process autopilot** reduces the operator's influence and offers process control without parameters.

By taking advantage of intelligence, our customers can gain higher bed utilization, leading to higher energy efficiency and capacity, better repeatability in quality, and also greater operational safety which is thanks to online stress calculations, traditionally manual work for occasional glass inspections. Based on data, every machine will be also able to take care of its own predictive maintenance and suggest spare parts, when needed.

Glaston ProL flat glass lamination line provides unprecedented flexibility for mixed production. The ProL convection heating chamber makes switching between glass types and different 'sandwiches' easier than ever. The whole line, from glass handling to the latest PVB cutting technology, has been designed for flexible operations.

The trend in flat lamination is a growing use of structural interlayers and for that Glaston has introduced the new convection control technology, offering a significantly wider operating window even with complex laminates.

A higher degree of automation is also on the agenda for the laminating process and with the lamination process autopilot, the furnace will learn to achieve the most optimal way of running instead of operators having to do adjustments manually.

Insulating glass manufacturing

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

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

Irrespective of whether a fully automatic line for I.G. production with warm-edge spacers or an entry-level solution: At Glaston every I.G. manufacturer will find the line or machine that meets their requirements.

The benchmark in this sector is the modern **Glaston SPEED** production line, which can be used to produce triple I.G. units at the same time it takes other lines to produce double I.G. units. At the other side of the product range is the **Glaston COMFORT**, the ideal entry-level solution to industrial I.G. production. It cannot be overlooked – the trend is always heading towards bigger I.G. units and facade elements.

With the **Glaston JUMBO** production line, XXL units up to 18 meters length can be manufactured.

The arrossing machine **Glaston MULTI'ARRISSER**, is a fast and user-friendly solution for the high-quality arrossing of straight glass

edges. The proven Glaston cup wheel technology, guarantees the best arrossing quality at low operating costs.

The cup wheels adapt individually to different edge geometries of rectangular and shaped formats. Glaston's cup wheel technology has a 5 to 10 times longer lifetime than other systems, leading to higher productivity. One cup wheel can be used for multiple functions – arrossing of the edge, basic edge planing, and corner dubbing.

Additionally, the cup wheels allow a maximum arrossing speed of 60 m/min, making MULTI'ARRISSER the fastest single-head machine worldwide.

Premium Low-E glass can be processed without any coated surface contact. Due to its compact design, MULTI'ARRISSER has a small footprint. It can be used as a standalone solution or integrated into an IG production line, enabling a wide range of applications in tempered, laminated, or insulating glass manufacturing.

Automotive & Display glass processing

Glaston CHAMP EVO automotive glass pre-processing solutions enable to enhance efficiency in the daily production of windshields, sidelites, backlites or quarterlites. This means a yield greater than 98%, shorter cycle times, reaction-fast software to minimize downtime, and an excellent cost-per-unit ratio.

The new CHAMP EVO machine generation includes two optimization features: a linear drive instead of the spindle on the grinding machine for higher precision and more dynamic movements, and also a honeycomb table on the grinding machine for higher precision and more dynamic movements.

With significantly improved performance parameters, the new **Glaston HYPERFEX grinding wheels** represents a revolution in edge grinding, with a holistic view of the overall process in pre-processing of glasses for different application areas.

Glaston BRIGHT EVO display glass solutions are individualized production systems for automatic cutting, breaking, grinding, and drilling of thin glass down to 0.4 mm in thickness. These thin glasses are used for monitors, TV screens, mobile devices as well as automotive glass displays. The machine configuration offers not only a process-optimized line layout but also various expansion options using upgrade kits.

Glaston MATRIX EVO, the automatic windshield bending furnace for fast, efficient, and high-performance windshield production, features a new windshield press for bending deep sags and wraps around corners to match the tightest tolerances. MATRIX EVO is available with different size and capacity configurations to reduce cycle times. Glaston's active convection technology in automotive glass heat treatment improves the process with coated, printed, and complex glass types and enables faster heating.

Glaston HTBS bending and tempering system covers a wide range of application areas in the automotive, appliance, and furniture glass industries. With its flexibility and high end-product quality, the HTBS furnace allows meeting evolving market requirements and processing multiple glass sheets in one production load. Glaston HTBS is available with the most dense control matrix in the market to meet the highest quality standards with bent tempered glass.

More about our products and services: www.glaston.net



GPM AUTOMATION Srl

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COMPANY DATA

Contacts

Alessandro Grando - CEO and board member
Loris Grando - CEO and board member

Annual Company Turnover

EUR 4 million

Sales

National (5%) / International (95%)

GPM automation operates in two main business areas:

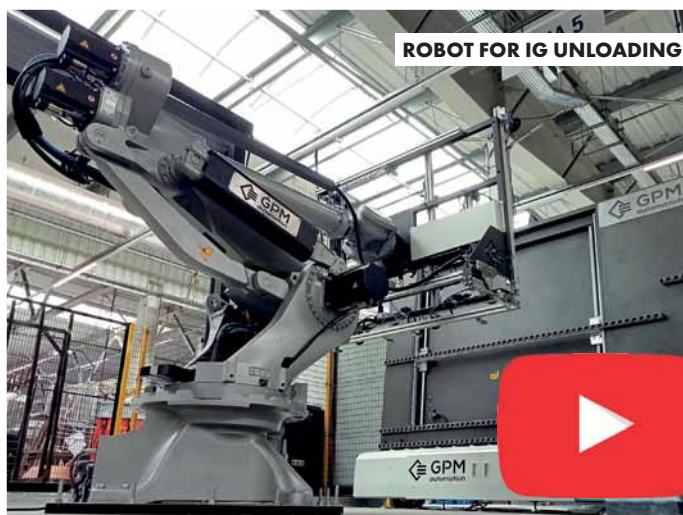
1- glass processing machineries: turnkey laminated glass plants including autoclave and climatic room, horizontal and vertical washers;

2- automation: sorting and stocking systems for glass, window, stone and ceramic tiles; robotic solutions for loading/unloading of third party lines such as insulating glass line, double edger, painting line, vertical CNC line, tempering furnace.

Our staff is made up of highly qualified people with decades of experience in the glass and automation world.

We focus on customer needs by proposing tailor made solutions. GPM automation is committed to providing reliable technologic machineries with customized to the specific design of each project.

We think that innovation and continuous improvement are keys on equipment development.



ROBOT FOR IG UNLOADING



SALES NETWORK

USA

CUSTOM GLASS MACHINERY LTD - MR MATTHEW TANGEMAN

5486 Taylor Lane Avenue - 43026 Hilliard
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E-mail: matthew.tangeman@customglassmachinery.com

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Tel. +33 4 93 806 469

E-mail: technis@orange.fr



ROBOT FOR IG LOADING

LAMINATED GLASS LINE



HORIZONTAL WASHER AND TILTING TABLE



HEGLA[®]

HEGLA

Industriestraße 21 - 37688 Beverungen - Germany
Tel.: +49 5273 905-0 - Fax: +49 5273 905-255

E-mail: info@hegla.de • www.hegla.com



COMPANY DATA

Contacts

Bernhard Hötger - CEO
Peter Herrmann - COO
Jochen Hesselbach - MD
Dr. Heinrich Ostendarp - CTIO
Stefan Reuter - CTO

Annual Group Turnover

EUR 104,000,000

Percentage of Turnover from Glass

100%

Quality Certifications

DIN EN ISO 9001:2015

Number of Employees

800

Registered Trademarks

SortJet, ReMaster, Optimax

Planned Exhibitions 2024

Fensterbau Frontale - Nuremberg, Germany - 19 / 22 March
WindoorEx Middle East - Cairo, Egypt - 17 / 20 May
WindoorEx Saudia Arabia - Riyadh, Saudi Arabia - 02 / 05 June
GlassBuild America - Dallas, USA - 30 September / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October

COMPANY PROFILE

Loading

For loading **HEGLA** offers different solutions such as Automatic Floor Loading Systems, Compact and Gantry Loaders. Double sided floor loaders of 3 x 2 metres and 6 x 3 metres are available with up to 6 positions (12 racks), while the gantry systems are infinitely variable and can use 'A' and 'L' frames as well as compact storage systems. 6 x 3-metre gantry loaders can also load directly from Float Liner delivery racks dropped in the crane area.

Float Glass Cutting

With its wide range of cutting systems, **HEGLA** offers a perfect solution for each and every customer needs. For the industrial volume cutting of float glass for example the Galactic with its shortest processing time and full automation was invented. **RA-PIDLINE**, with its optional grinding device for low-E, is **HEGLA's** universal cutting machine for float glass.



Linear Driven Cutting Machine for float glass: Hegla Galactic

ProLam LSR – Greater productivity for LSG Cutting

With the ProLam LSR, LSG cutting is faster than ever before. Thanks to the newly developed laser separation technology, the film can be heated up much faster than before. The overall process has also been accelerated, increasing productivity by 20 per cent or more compared to conventional cutting systems. The system's high performance is not only reflected in its cycle time and precise cutting results - with the new laser technology the surrounding glass area remains cold. This systematic improvement counters downstream delamination and visible blurring around the edges.



SALES NETWORK

GERMANY

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FRANCE

HEGLA France S.a.r.l

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UNITED KINGDOM

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MENA

HEGLATRADING & SERVICE GmbH

Dubai Silicon Oasis - Head Quarter Building
DG-02 Office - Dubai, UAE - Tel.: + 971 50 52 00 516
E-mail: info@hegla.ae - info@heglaus.com



ProLam LSR: Improved productivity and edge quality thanks to laser diode heating technology

Laser Markings for Glass

The ES-Guard laser marking system of HEGLA boraident enables a non-destructive marking of coated and uncoated glass surfaces. The glass is marked using our reliable and patented laser transfer technology, UniColor. As an added advantage, the machine is designed for fully automatic operation on production or cutting lines. Besides, thanks to the laser technology the markings are attached within the panel for its entire life cycle, giving us important information that is collected and saved.

ReMaster

The ReMaster for optimised processing of remnant sheets is an innovative system that allows sub-plates of any type be stored without manual handling above the cutting line. Without interrupting the production process the remnant can be used for following glass runs, thus reducing sub plate waste drastically. This creates the basis for efficient production of IG-units of all glass

POLAND

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HEGLA SortJet: Invented to reduce material costs and improve production flow

types and thicknesses. It offers optimal utilization of subplates, decreases material costs and reduces unnecessary handling.

SortJet

With the need for more and more automation and high-speed operations in glassworks, HEGLA invented the SortJet – An innovative product that not only improves material flow but also reduces material costs to a minimum. After cutting the glass in random order to reduce offcuts, all panes are stored in the dynamic buffer of the SortJet. Just 250 bays can accommodate multiple panes to buffer all the glasses in the production process for an insulation glass line. When the panes for an IG-unit are required on the line, the individual panes are handed over directly in production orientation and sequence. The separate processes in front of and behind the dynamic buffer contribute towards a production process that significantly reduces downtime while at the same time accelerating the material flow and reducing cutting costs.

helios quartz®



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COMPANY DATA

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Luigi Gastaldo - CEO

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TURKEY

HELIOS QUARTZ TURKEY

Commercial branch for Turkey region

Mimaroba Mh. Mustafa Kemal Bulvarı.
Colorist A Blok. Kat 3 D.50

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EUROPE (Headquarters)

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- **IR AND UV LAMPS AND SYSTEMS**
- **INTEGRATED EFFICIENT SOLUTIONS**
- **R&D SOLUTIONS**
- **TURN-KEY PROJECTS**

Planned Exhibitions 2024

Paintexpo

Karlsruhe, Germany - 9 / 12 April

China Plas

Shanghai, China - 23 / 26 April

China Glass

Shanghai, China - 25 / 28 April

Drupa

Düsseldorf, Germany - 28 May / 7 June

Glass South America

San Paulo, Brazil - 12 / 15 June

Battery Show Europe

Stuttgart, Germany - 18 / 20 June

Chemspec

Düsseldorf, Germany - 19 / 20 June

Battery Show North America

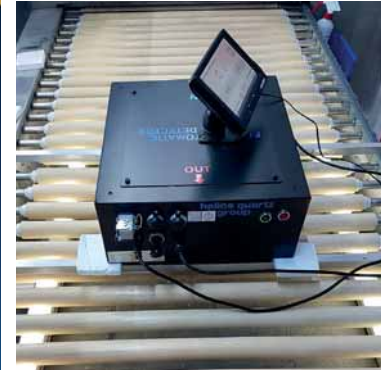
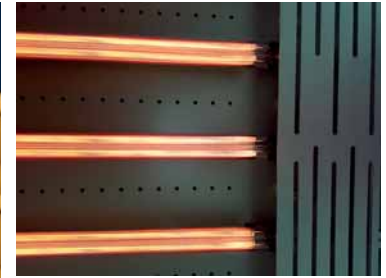
Detroit, (MI) USA - 8 / 10 October

Fakuma

Friedrichshafen, Germany - 15 / 19 October

Glasstec

Düsseldorf, Germany - 22 / 25 October



COMPANY PROFILE

HELIOS QUARTZ was founded in 1940 as a family-owned company in the busy city of Milan. Since then, it has grown and developed, becoming an important group of companies with two production plants, the historical one in Italy (Helios Italquartz S.r.l.) and the new facility in Switzerland (Helios Quartz Group SA), combined with distribution channels in the US, South America and Asia.

Helios Quartz is now an international player and a well-known supplier for Quartz Glass processing and the manufacturing of Infrared Emitters and Ultraviolet Lamps. Helios Quartz also produces Specialized Equipment for Industrial, Scientific and Medical applications.

TÜV certified, Helios Quartz is a very flexible and dynamic group which is deeply oriented towards internationalization and which is living a strong and stable growth phase with great momentum: in the last 10 years, Helios Quartz has opened commercial branches in the US (Helios Quartz America), in China (Shenyang Helios Tech) and Hong Kong (Helios Quartz Asia).

Thanks to its experience in different fields

and to its cutting-edge testing laboratory located in the historical Helios Italquartz S.r.l. plant in Cambiago (Italy), Helios Quartz can be a strategic Partner to realize integrated solutions for every specific application.

HELIOS QUARTZ is focusing in being a Best Partner, not just a supplier.

Helios Quartz products range for the glass industry include:

- **QUARTZ INFRARED HEATERS** in short, medium and fast medium wavelength, in single and twin tube, with or without gold reflector for:

- *Laminating lines* (plastic film coupling);
- *Screen printing lines;*
- *Bending furnaces;*
- *Fusion furnaces;*
- *Laminated glass cutting tables;*

- **INFRARED MODULES:** complete infrared solutions, designed and customizes according to customer needs, and ready to be integrated in existing machines and production lines;

- **UV POLYMERIZATION EQUIPMENT:** UV high and medium pressure lamps for drying screen printing of reactive inks, paints, coatings and adhesives for the decorating and furnishing sector;

- **TIN DETECTOR EQUIPMENT:** UV black light devices which are able to detect the tin coated side of the float glass even under high brightness conditions. This kind of detection is crucial before processes such as laminating, mirroring, printing and decorating. Helios Quartz offers two type of device:

- **MANWOOD 25-N:** manual equipment.

- **AUTOMATIC TIN SIDE DETECTOR:** compact automatic version of this device. It can be fixed directly on the glass transportation line, before the production process, in order to check each and every piece of glass. A user-friendly PLC helps the operator in calibrating and managing the different recipes.



HORN GLASS INDUSTRIES AG

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COMPANY DATA

Contacts

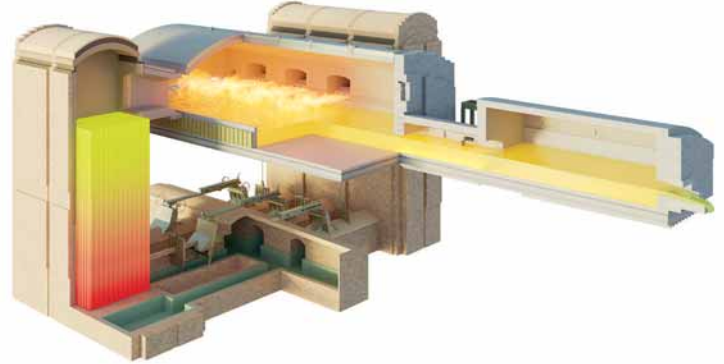
- Stephan Meindl** - President and CEO
- Ekaterina Firsova** - Executive Director Glass Plant Technology
- Ulrich Imhof** - Executive Director Container/Special Glass
- Andreas Kopp** - Managing Director HORN Bau & Service GmbH

Number of Employees

Approx. 450 (worldwide)

Company founded

1999





COMPANY PROFILE

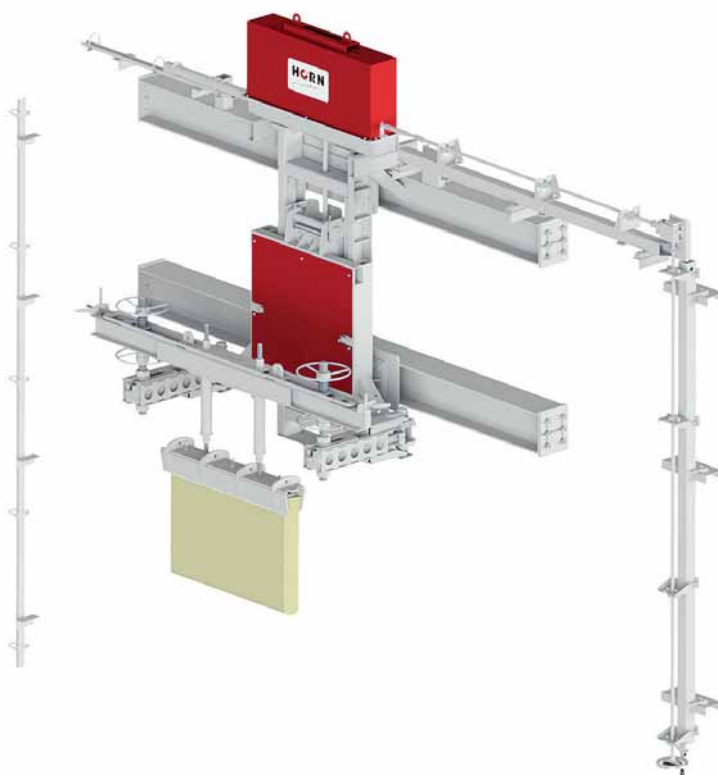
At its location in Plößberg, Germany, **HORN Glass Industries AG** designs and makes glass melting technology and turnkey projects for the float and container glass industries. The company's high-performance glass melting furnaces and turnkey projects are installed at glass manufacturers all over the world and serve the production of beverage bottles, food containers, drinking glasses, glass panes, glass tubes, glass fibres and special glass.

With more than 135 years of experience, HORN has been the specialist and expert in the field of the construction of glass melting furnaces for many years, and is now one of the industry leaders in the implementation of turnkey projects.

Subsidiary companies in China, Malaysia, India, Croatia, Ukraine, Brazil and the Czech Republic add value to global customers, offering proximity and prompt response in the global market. Almost 90% of HORN's products are exported from Plößberg in Upper Palatinate to more than 75 countries worldwide.

HORN offers its customers complete support and a helping hand at all times. HORN can offer tailor-made solutions because we have a very high level of vertical integration for all our products. HORN has ventured into unknown areas, e.g. in the construction of its own tin baths and associated equipment. HORN manufactures a large number of products in its workshops in Plößberg:

- Glass melting furnaces (container glass, float glass, etc.)
- Tin baths
- Batch chargers
- Stirrers
- Gas, oil and heavy oil heating for melting furnaces
- Tin bath equipment such as top roller, pusher, flags, fences
- Tweel
- Dross boxes
- Shield gas supply stations



PRODUCT RANGE

MELTING FURNACES
TURNKEY TECHNOLOGICAL
PLANTS
PROJECT ENGINEERING
FINANCING & AUTHORISATIONS
PROJECT MANAGEMENT ON SITE
TRAINING
OPERATIONAL SUPPORT

TIN BATHS
HEATING EQUIPMENT
CONTROL EQUIPMENT
ELECTRIC BOOSTING SYSTEMS
BATCH CHARGERS
MEDIA SUPPLY EQUIPMENT
SERVICE WORKS
FOREHEARTHES



IMMMES Srl

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COMPANY DATA

Contacts

Paolo Reffo Scarso - Sales Director

Annual Group Turnover

EUR 7.8 mln

Annual Company Turnover

EUR 7.8 mln

Percentage of turnover from glass (%)

80

Percentage of third-party turnover (%)

20

Sales

Domestic (25%) / International (75%)

Banks

Unicredit Bank Group - Italy

Area

Offices 550 m² / Production 4000 m²

Number of Employees

34

Founding Year

1989

Registered Brands

IMMMES - DTP - SRS

Parent and Sister Companies

IMMMES BRASIL

San Paolo - Brasil

Planned Exhibitions 2024

Glass South America - San Paulo, Brazil - 12 / 15 June

Glasstech Mexico - Guadalajara, Mexico - 9 / 11 July

GlassBuild America - Dallas (TEX), USA - 30 Sept. / 2 October

Glasstetec - Düsseldorf, Germany - 22 / 25 October

Veteco - Madrid, Spain - 5 / 8 November

ZAK Glass - New Delhi, India - 5 / 7 December

COMPANY PROFILE

Founded in 1989, **IMMMES** initially built and assembled wooden structures of medium-heavy dimensions.

The young company grew quickly, thanks to a passion for work coupled with the great carpentry industry experience of business partners Giuseppe Comberlato and Giulio Vettorato. A technical office was soon opened to begin planning and producing innovative plants and machinery whilst jointly offering to clients customized, advantageous solutions.

Being directly managed by the two partners, technical and design solutions accompanied by acute attention to detail as well as prompt assistance service all united to afford the company great opportunities - thus confirming IMMMES as a quality brand. By the 90's it already counted more than 20 employees, which precisely coincided with the years that saw the first system for industrial water treatment - an event that was to profoundly mark the company's future.

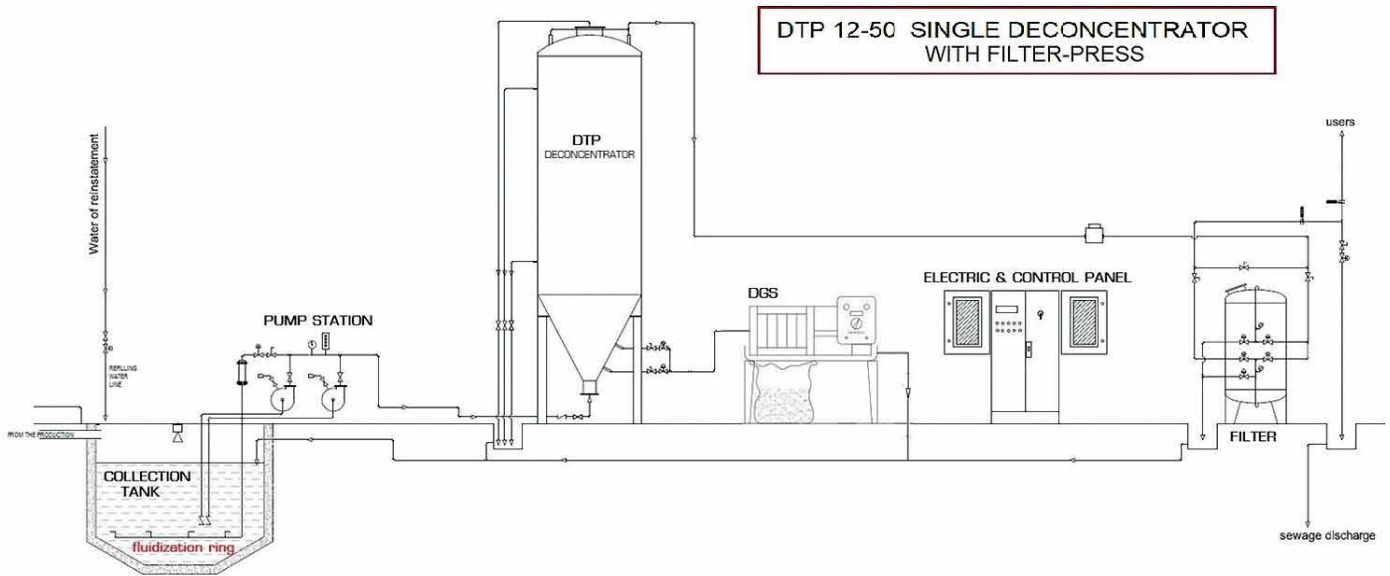
At that, the water treatment sector grew exponentially, leaving



IMMMES unaffected by the initial years of the crisis that spread from 2007, both throughout Italy and Europe-wide. The company then attained to 150 installed water treatment systems by 2009, further realizing many plants for the glass industry. The following years marked the start of IMMMES' relations with foreign markets, leading up to 2022 and an excess of 500 installed plants - and the story goes on!

DTP TREATS WATER BY A COMBINATION OF PHYSICAL-DYNAMIC SEPARATION AND A PROCESS OF FILTRATION

Technical scheme



IMMES
The Spirit of Innovation

DTP

THE TOP IN WATER DEPURATION FOR GLASS INDUSTRY





ITALCARRELLI SpA

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COMPANY DATA

Contacts

Agostino Negrin - President
Alessandro Negrin - President
Stefania Negrin - Vice-President
Ivan Lambertucci - CEO
Davide Schiavon - Sales Manager

Annual Turnover of the Company

EUR 10 / 50 mil

Sales

Domestic (3%) / International (97%)

Quality Certifications

ISO 9001:2015

Banks

Intesa San Paolo - Arzignano

Number of Employees

> 100

Founding Year

1962

Registered Patents

Telescopic Arm for rack handling in autoclaves, Collar Handling Device, ABV Device/EN BOX for glass handling in containers, Battery Exchange System, Side-loader telescopic cab, Side-loaders equipment for handling glass boxes, PTN inloader with adjustable trailer width, Laser guided jumbo frame transporter PTN 330 LGV and laser scanners self-regulation support

Registered Trademarks

Italcarrelli

Planned Exhibitions 2024

China Glass - Shanghai, China - 2 / 28 April
Glass South America - São Paulo, Brazil - 12 / 15 June
GlassBuild America - Dallas, USA
 30 September / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October



SIDE-LOADERS



SPECIAL-APPLICATION SIDE-LOADERS



LAMINATED GLASS HANDLING



PLATFORM TRANSPORTERS



CONTAINER LOAD/UNLOAD



INLOADER TRANSPORTERS

COMPANY PROFILE

SMART WORKING, SAFE WORKING WITH TOP HANDLING SOLUTIONS

ITALCARRELLI® designs and builds special machines, technology and accessories for the transport and storage of glass. After many years of hard work, the Company has put into practice its idea of smart work.

- Smart – with clients to create personalized machines responding to their precise needs and demands;
- Smart – with suppliers to have the constant availability of top class material and components;
- Smart – solutions both with regards to technology and energy savings;
- Smart – for safety each and every day.

Thanks to the perfect synergy between the company's design departments and software development, Italcarrelli's machines have the highest levels of performance and ease of use, with low energy consumption levels.

PRODUCT RANGE

- PLATFORM TRANSPORTERS
- INLOADER TRANSPORTERS
- SIDE-LOADERS
- SPECIAL SOLUTIONS
- CONTAINER LOAD/UNLOAD
- LAMINATED GLASS HANDLING



ITALMATIC Srl

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E-mail: info@italmatic.eu • www.italmatic.eu

COMPANY DATA

Contacts

Roberto Frediani - Managing Director

Adriano Frediani - CEO

Massimo Ghitturi - Member of Board of Directors

Annual Group Turnover

EUR 50 million

Annual Company Turnover

EUR 20 million

Percentage of turnover from glass

20%

Sales

National (30%) / International (70%)

Quality certifications

ISO 9001

Banks

Intesa S. Paolo

Area

Offices 600 m² / Plants 8000 m²

Number of Employees

60

Paid-in capital

EUR 46.481,12

Founding year

1987

Registered Trademarks

Italmatic - Comfort





COMPANY PROFILE

New autoclaves for curved glass and windshield

ITALMATIC, leader in the research, design and construction of autoclaves for various applications, has developed a new generation of advanced and innovative machines for the treatment of curved glass and windscreens.

These autoclaves, the result of research, development and experience acquired over the years, have been designed with the aid of the most sophisticated structural and thermodynamic calculation programs, such as the new dynamic flow simulator C.F.D. (Computational Fluid Dynamics).

In the design, particular attention was paid to energy saving, adopting innovative materials for thermal insulation, high efficiency motors controlled by inverters, heating systems (electric, diathermic oil or steam) with infinitesimal control, as well as new control systems capable of managing power and flow distribution, thus allowing significant reductions in operating costs.

The machine can also be made with two doors, one on each side, to allow the automatic and/or manual introduction and

unloading of the glass holder carriages, thereby speeding up the loading and unloading operations, especially for continuous production of both 24/24h and 7/7g.

For a better internal chamber uniformity, according to the different loads and positioning of the glass under treatment, the motor fan units have been positioned in the upper part in direct contact with the heating and cooling exchangers.

This innovation has made it possible to work for defined areas within the chamber, managing each area according to the load and with the best uniformity.

Orientation and modulation of the ventilation, with variation of the fluid transfer speed on the products, ensures that glass quality conforms to even the most restrictive market requirements.

The control system, called **ICS (Italmatic Control System)**, allows you to program, supervise and have complete traceability of production batches - both automatically and manually, in order to allow for analysis of all process cycles.

The control system meets every industry 4.0 requirement and can also be interfaced with the company MES.



ITALMOLE Srl

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COMPANY DATA

Contacts

Ivan Rossi - Owner Partner / Sales and Technical Manager
Graziano Venturi - Senior Owner Partner

Sale

Domestic (20%) / International (80%)

Area

Office 50 m² / Production unit 2000 m²

Founding Year

1978

Planned Exhibitions 2024

Glasstec - Düsseldorf, Germany - 22 / 25 October

COMPANY PROFILE

ITALMOLE S.r.l., founded in 1978, has more than 40 years of experience and has developed a complete range of polishing wheels for all types of machines, satisfying all requests coming from the glass market.

Every day is a new challenge and new inspiration: trying to propose products leads to improving the work of end users, supporting and assisting dealers in recommending the right wheel for each and every application, and guaranteeing the best service, technical assistance and fast production of orders.

The strongpoints of Italmole are a fusion of experience and innovation that it has earned with the awareness and good results obtained in the past that have become the key to maintain and guarantee the continuity of success in the future.

Italmole is also a group of people who work together to reach the same goal, to provide a very high standard of quality with precise products, in a constantly evolving way for their customers.



The company's most popular products are peripheral wheels type "BD" and engraving wheels type "BD2".

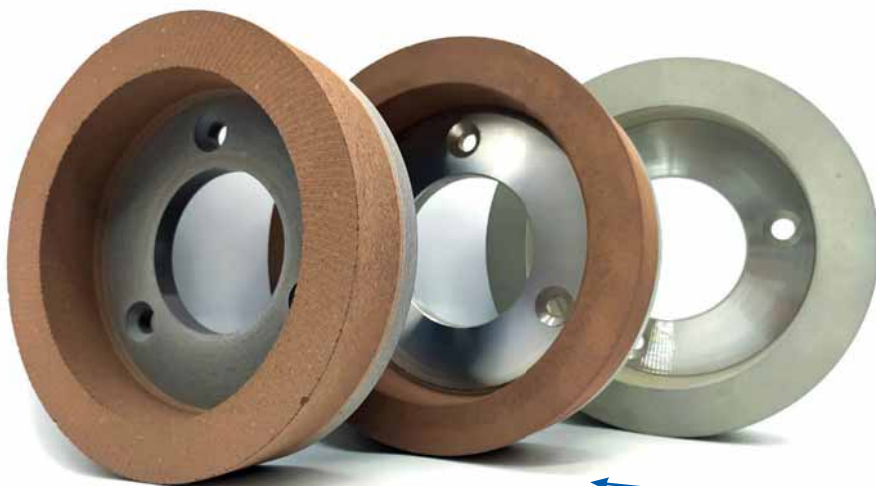
These ranges of polishing wheels are, and have been right from the start, synonymous of adaptability, ease of use and high-level polishing.

Italmole has created numerous ranges of cup wheels, polishing wheels for arris, cerium wheels and wheels for removing low-E glass.

Italmole has recently expanded the range of cup wheels and introduced the new "ALFA" line which guarantees a longer life and a better polishing quality. These wheels are produced for all types of machines and for all types of fixing in the grits 40,60,80 and 120. They are available with rigid plastic plate, aluminum plate and special Baveloni "J40" plate. On request with sectors for laminated glass.



CUP WHEEL LINE «X» IN DIFFERENT DIMENSION FOR ALL TYPES OF MACHINES, WITH SPECIAL PLATES AND ALL FIXING



PRODUCT RANGE

- Peripheral wheels
- Engraving wheels
- Cup wheels
- Edge-deletion wheels

BDCUP AND BLACK WHEELS FOR ARRIS WITH ALUMINIUM AND PLASTIC PLATE FOR BENTELER MACHINE



keraglass



KERAGLASS Srl

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E-mail: info@keraglass.com • www.keraglass.com

COMPANY DATA

Contacts

Stefano Spezzani – Founder, Vice President
Maicol Spezzani – Director, Sales & Marketing Officer
Luca Calanca – Director, Administrative & Operating Officer
Paolo Righi – Technical & Service Manager

Mother Company

Voiláp

Annual Group Turnover

EUR 390,000,000.00

Annual Company Turnover

EUR 60,000,000.00

Sales

Domestic (15%) / International (85%)

Parent and Sister Companies

Keraglass South America do Brasil Ltda

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12655 Guarulhos SP - Brazil - Tel.: +55 11 954407000
E-mail: southamerica@keraglass.com

Keraglass USA Inc.

20 Murray Hill Parkway, Unit 120 - East Rutherford - NJ 07073
USA - Tel.: +1 201 561 2191 - E-mail: info.usa@keraglass.com

COMPANY PROFILE

Keraglass is the world's leading Italian manufacturer of glass processing plants and equipment, thanks to the design and production of a range of high-tech glass tempering, laminating and decorating solutions. An all-round approach that makes this company an ever higher performing and more competitive player on the global market.

Planned Exhibitions 2024

Glass Expo Southeast

Orlando (FL), USA - 25 / 26 January

GPAD

Nashville (TN), USA - 5 / 6 March

Mid-Atlantic Glass Expo

Greenbelt (MD), USA - 17 April

Glass South America

San Paolo, Brazil - 12 / 15 June

Glasstech Mexico

Guadalajara, Mexico - 9 / 11 July

GlassBuild America

Dallas (TX), USA - 30 September / 2 October

Glasstec

Dusseldorf, Germany - 22 / 25 October

Veteco

Madrid, Spain - 5 / 8 November

Eurasia Glass

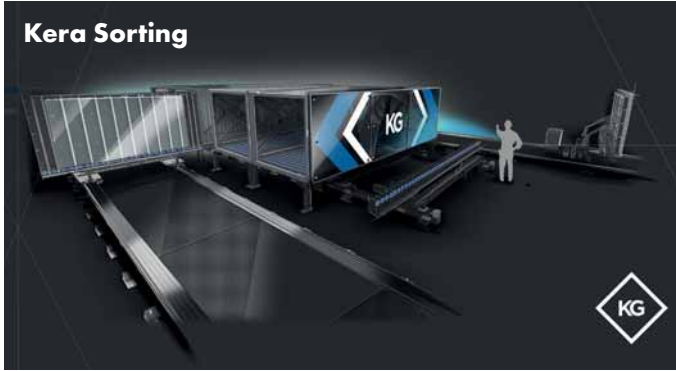
Istanbul, Turkey - 16 / 19 November

Big 5 / Gulf Glass

Dubai, UAE - 26 / 29 November



Vision - oscillating tempering furnace



SALES NETWORK

AUSTRIA - GERMANY - SWITZERLAND

MODECO GLOBAL GMBH
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SPAIN

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COLOMBIA - ECUADOR - PANAMA - VENEZUELA

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BAHRAIN - OMAN - QATAR - YEMEN
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BELGIUM - LUXEMBOURG - THE NETHERLANDS

GKSERVICE BVBA
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E-mail: adrian@alumach.com



LandGlass



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E-mail: marketing@landglass.com • www.landglass.net

COMPANY DATA

Contacts

Zhao Yan - General Manager

Planned Exhibitions 2024

- Mir Stekla** - Moscow, Russia - 27 February / 1 March
- China Glass** - Shanghai, China - 25 / 28 April
- GlassBuild America** - Dallas, USA - 30 September / 2 October
- Glasstec** - Düsseldorf, Germany - 22 / 25 October
- Eurasia Glass** - Istanbul, Turkey - 16 / 19 November
- ZAK Glass** - New Delhi, India - 5 / 7 December
- Glasstech Asia** - Ho Chi Minh, Vietnam - 11 / 13 December



COMPANY PROFILE

Landglass: Ideal partner for tempered glass manufacturers

All-New Cyclone™ Series Glass Tempering Furnaces

The legendary and benchmark product in the intelligent glass tempering field with thirteen innovative technologies and nearly a hundred innovations and creations
Capable of providing systematic solutions for flat and curved tempered glass for architecture and furniture, vehicle, home appliances, and solar power industries, fulfilling the ultimate demand for top quality tempered glass!

All-New UltraJet™ Series Glass Tempering Furnaces

With the inherited advantages of the classic JetConvection™ Glass Tempering Furnaces, the all new UltraJet™ series, equipped

Intelligent Glass Tempering Furnace Solutions

- Five Major Advantages
- Hundreds of Innovations
- Remarkable Outcome
- Stimulate the Development of Four Industries



Cyclone™ Series Glass Tempering Furnaces

UltraJet™ Series Glass Tempering Furnaces

JetConvection™ Series Glass Tempering Furnaces



- Efficient Production
- Cost Effective
- Quality Improvement
- Extremely Energy Efficient
- Outstanding Noise Reduction
- Condensation-free

www.landglass.net
+86-379-80890369

with six major innovative technologies, fulfills the diversified demands from architecture and furniture, vehicle, home appliances, and solar power industries for flat and curved tempered glass with both quality and capacity guaranteed.

All-New JetConvection™ Series Glass Tempering Furnaces

As the pioneer in Forced Convection Technology, LandGlass' high quality and efficiency advantages revealed in high-performance Low-E Glass Tempering made the JetConvection™ series glass tempering furnace a two-time winner of the National Patent Gold Award and an iconic product in the forced convection glass tempering machinery.

At present, more than one thousand furnaces of this series have been sold to over sixty countries and regions worldwide, becoming one of the legendary products of LandGlass.

LandGlass TIGER™ Smart Factory

LandGlass TIGER™ Smart Factory employs the new generation enterprise resource planning system, intelligent manufacturing technology and identification technology to interconnect all machinery throughout the entire process from float glass to finished products. It has realized digital and intelligent processing of supply, manufacturing, and sales information during production, achieving lean and efficient manufacturing and management.

About LandVac

LandVac®: fully tempered vacuum insulated glass
LandVac® is a wholly-owned brand of LandGlass. LandVac® Tempered Vacuum Insulated Glass, is backed by eight major technologies:

Noise Reduction: With its weighted sound reduction index exceeding 39dB, LandVac makes rooms in downtown quiet like a library.

Energy Conservation: U-value as low as 0.4W/(m² • K). A 8.3 mm thick LandVac has better thermal insulation effect than the 1.5m thick brick wall.

Free of Condensation: Remain condensation-free when the temperature difference between the two sides exceeds 70°C, keeping away from condensation

Tempered and Safe: Completely retains the high strength, impact resistance, and other safety characteristics of tempered glass with its unique FLAS Flexible Lead-free Alloy Sentry technology.



Outstanding Adaptability: Since there is no thermal expansion or contraction in the high vacuum chamber of LandVac, the use of LandVac is not limited by geographical locations, elevation, or installation angle.

Super Long Life: The service life expectancy of Landvac exceeds 25 years.

Thin and Lightweight: A piece of 8.3 mm thick LandVac weighs only 20kg/m². It reduces the use of materials while extending the service life of hardware. The costs on storage and logistics are also significantly reduced.

Lead-free: The Testing Report from CTI, which is authorized by RoHS EU, has witnessed the outstanding environmental-friendly performance of Landvac.

PRODUCT RANGE

- Cyclone™ Series Glass Tempering Furnaces
- UltraJet™ Series Glass Tempering Furnaces
- JetConvection™ Series Glass Tempering Furnaces
- TIGER™ Smart Factory
- Landvac® Tempered Vacuum Insulated Glass

LiSEC



LiSEC AUSTRIA GMBH

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COMPANY DATA

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CEO

Founding Year

1961

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web: glastronic.lisc.com

Schraml Glastechnik GmbH

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E-mail: schraml@lisc.com - web: www.schraml.com

Number of Employees

1,300

Planned Exhibitions 2024

China Glass - Shanghai, China - 25 / 28 April

GlassBuild America - Dallas, USA - 30 Sept. / 2 October

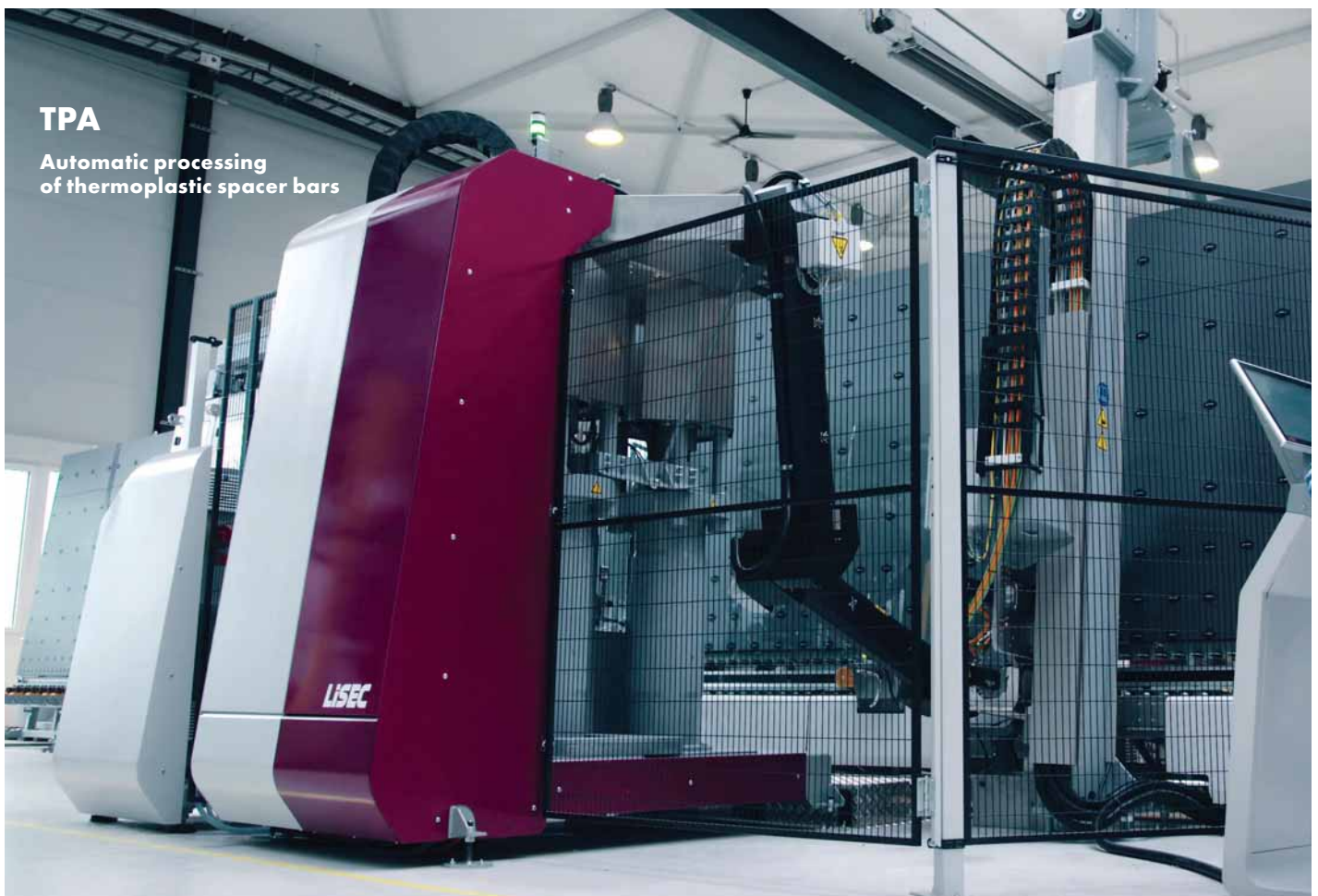
Glasstec - Düsseldorf, Germany - 22 / 25 October

Glasstech Asia

Ho Chi Minh City, Vietnam - 11 / 13 December

TPA

Automatic processing
of thermoplastic spacer bars



COMPANY PROFILE

LiSEC, with headquarters in Seitenstetten/Amstetten, Austria, LiSEC is a worldwide group of companies that for over 60 years has provided individual and comprehensive solutions in flat glass processing and refining. Its businesses include machines, automation solutions and services. In 2023, the group with about 1,300 employees and 20 locations achieved an export ratio of more than 95 percent and generated sales of almost €300 million. LiSEC develops and manufactures glass cutting and sorting systems, single components and complete production lines for fabricating insulating glass and laminated glass, as well as machines for glass edge processing and tempering. With reliable technology and intelligent automation solutions, LiSEC sets standards in quality and technology and significantly contributes to the success of its customers.



SALES NETWORK

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Tel.: +971 4 2994-596 - Fax: +971 4 2994-740
E-mail: sales.middleeast@lisc.com

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You can find a full list of
our Sales Network on:
www.lisc.com



PRODUCT RANGE

- Glass Cutting machines
- Insulating Glass Production machines
- Sorting & Logistic Systems
- Laminated Glass Production machines
- Flat Glass Processing machines
- Glass Processing & Washing machines
- Tempering
- Business Software
- After Sales / Service



MAPPI
BEYOND GLASS PERFECTION

MAPPI INTERNATIONAL Srl

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COMPANY DATA

Contacts

Nancy Mammaro - Managing Director
Ermanno Petitti - Sales Manager
Giulio Dalla Costa - Automation Manager

Annual Turnover of the Company

EUR 13,000,000

Percentage of turnover from glass (%)

100

Sales

Domestic (10%) / International (90%)

Area

Offices 1000 m² / Plants 4000 m²

Number of Employees

55

Founding Year

1993

Registered Trademarks

Mappi

Parent and Sister Companies

Mappi America

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SALES NETWORK

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www.dumatek.fr

GERMANY - THE NETHERLAND

- BELGIUM - SWITZERLAND -

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Füldner Machines BV

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www.fuldner.nl

FOR ITALY SEE:

www.mappi.it/contact-us/agents/

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PORTUGAL

MAVETRO

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ROMANIA - HUNGARY

IMROGLASS S.R.L.

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SLOVENIA - CROATIA - BOSNIA AND HERZEGOVINA - SERBIA BULGARIA - SLOVAK REP. KOSOVO - MACEDONIA MONTENEGRO

GLASMIK D.O.O.

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www.glasmik.com

BRAZIL

Italotec Maquinas

E-mail: vendas@italotec.com.br

SPAIN

TekVimo

E-mail: j.mora@tekvimo.es

MIDDLE ITALY

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www.tecnovati.it

UK - IRELAND

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COLOMBIA

Glasstools

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DANIMARCA

DMT APS

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LITUANIA - FINLANDIA - SVEZIA - NORVEGIA - BIELORUSSIA - UCRAINA GLASSPRO

E-mail: nerijus.leskauskas@glasspro.lt

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www.tgm-japan.com

MEXICO

Marbolz Vetrostile

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www.vetrostile.com

MIDDLE EAST

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KPD TECHNO

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USA: see MAPPI AMERICA

VIETNAM - LAOS - CAMBODIA -

PHILIPPINES - SINGAPORE -

MALAYSIA - THAILAND -

INDONESIA - MYANMAR

EUROTECHCORP

E-mail: eurotechline@gmail.com

COMPANY PROFILE

MAPPI INTERNATIONAL: CONTINUOUS SEARCH FOR INNOVATION

Mappi International has been designing and manufacturing high quality tempering systems for the glass industry since 1993. Hundreds of plants installed all over the world are a demonstration of the company's steady growth, important investments in research and development, uncompromising quality, and attention to the specific needs of each and every customer.

Mappi International manufactures each and every product in-

house and therefore has complete quality control of all components, guaranteeing the highest quality performance and functionality of its machines – constantly. Mappi America, located in Florida, enables the customer service department to reach each and every plant within 24 hours.

Thanks to collaboration with Siemens, Mappi machines are, first in the entire glass industry, recognized as 'Powered by Siemens'. This means that they are ready to implement all MindSphere applications, ready to enter the world of Industry 4.0, ready to change the way of working in the glass industry, with total integration between the furnace and all production processes, from planning to quality reports. Mappi's path of innovation continues with Supertemper, the exclusive feature that opens up a new frontier of fireproof glass: a furnace equipped with Supertemper can produce E30 certified glass for fire resistance.

From design to assistance, quality is at the centre of every thought and action of Mappi. This quality is found both in the design and in the range of products, where machines are different in size, technical solutions, mechanical engineering, and software solutions. User-friendly machines that have been designed to minimize downtime during shutdown and subsequent restart, along with the constant perfection of glass and important energy savings, show just how Mappi produces tempering furnaces that go beyond perfection day after day. Nancy Mammaro, CEO of Mappi says: "Our payoff, 'beyond glass perfection', sums up in three words our everyday aim shared at every level and in every area in Mappi." Over the years, Mappi has never changed its aim: to become the leader in tempering furnaces and manufacturing, and to constantly increase quality and customization to satisfy the specific needs of each customer.

Main features:

MHS | MULTIZONE HEATING SYSTEM

Automatically manages the temperature of the furnace by means of a network of electronically controlled sensors that maintain temperatures constant and focus heat only in areas where there is glass.

IHS | INTELLIGENT HEATING SYSTEM

The internal temperature of the furnace is controlled with an accuracy of +/- 1 C, preventing overheating of the ceramic rollers and avoiding downtime for the adaptation of the furnace temperature.

ESS | ENERGY SAVING SYSTEM Heating and forced ventilation stages are coordinated and managed by a computerized system optimizing consumption and significantly reducing the installed power required by the entire system.



SYNCRO | TRASMISSION TECHNOLOGY

The ceramic rollers are driven accurately within 1/1000mm by DC drive motor with a friction transmission between iron/rubber (avoids slack time gaps, gear lash, with resulting risks of marks on the glass).

This eliminates the need of SO2. Brushless motors control roller drives to guarantee accurate roller position and speed.

Automatic speed management of the ceramic roller oscillation avoids distortions and damage to the glass surface. Full ceramic rolls, which can be easily replaced.

ITS | INTEGRATED TOUCH SYSTEM

The system monitors the parameters of the tempering process and immediately prints the compliance report for CE and ANSI glass standards at the same time, automatically storing this information for each production cycle.

AC | ADVANCED COOLING

A particular design of the blowing system that allows even more specific control while tempering, and substantially decreases the iridescence of the glass.

ATI | ACTIVE THERMAL INSULATION

The ATI completely reduces thermal dispersion thanks to continuous research in the best performing materials for thermal insulation, in association with the most prestigious research centres in Europe, as well as with Knauf and Morgan.

GHBS | XTREME PROFILE CONVECTION GHBS allows to process all last-generation coated glass, including low-E with 0.01 Emissivity.

HEATING CHAMBER EXTRACTION

Mappi is the only tempering equipment manufacturer that has this feature for easier maintenance and better finished product quality. ATS 4.0 is available from 1500 x 3800 to 3300 x 6000 mm and also in customizable sizes.




MARPOSS



MARPOSS SpA

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E-mail: marposs@marposs.com • www.marposs.com

COMPANY DATA

Annual Turnover of the Group

Approx EUR 500 million

Sales

Domestic (6%) / International (94%)

Quality Certifications

ISO 9001 - ISO 14001 - ISO 45001

Number of Employees

3500

Founding Year

1952

Planned Exhibitions 2024

Glasstec - Düsseldorf, Germany - 22 / 25 October

COMPANY PROFILE

With the will to diversify our offer we are providing solutions to the automotive glass industry since more than 20 years but MARPOSS was founded in 1952 and Mr. Stefano Possati is the President of the Group; it provides shop-floor solutions for quality control in the production environment. MARPOSS' solutions include gauging equipment for mechanical components, before, during and after the production process; monitoring solutions on machine tools; assembly and testing for many industry sectors; and automatic machines and inspection stations for production lines. MARPOSS is one of the main suppliers to the automotive industry supporting the transition to e-mobility, but additionally operates in the aerospace, biomedical, hi-tech, appliance and glass containers industries. MARPOSS Group employs 3500 people around the world and is present in 34 countries with more than 80 sales offices. Over the past 20 years, we have acquired more than 30 companies with specific technologies into the group to always have the correct solution for our customers. One of the most recent with greater relevance for this market segment is Stil; a French company that has patented the confocal technology applied to quality control (website: www.stil-sensors.com/eng/).



PRODUCT RANGE

- PENCIL PROBES
- CONFOCAL SENSORS (MARPOSS STIL)
- MODULAR INTERFACE UNITS
- MEASURING SOFTWARE
- INDUSTRIAL PC
- FLEXIBLE NON-CONTACT APPLICATION
- OPTICAL INSPECTIONS
- MEASUREMENT & CONTROL SYSTEMS
- TAYLOR MADE SOLUTIONS

COMPLETE LIST



MEASURING INSPECTIONS FOR AUTOMOTIVE GLASS

NON-CONTACT SENSORS

TOUCH PROBES

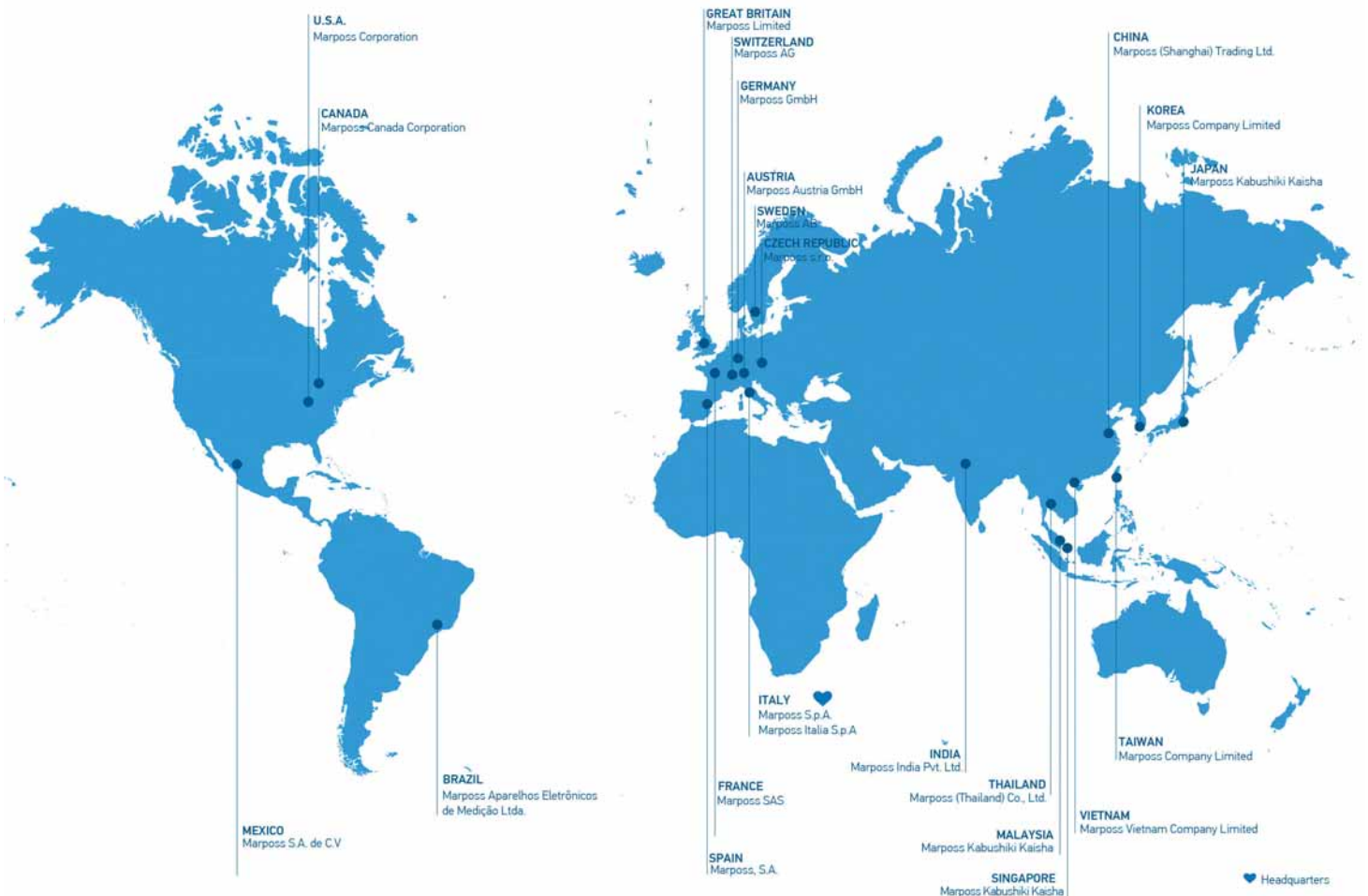
MODULAR INTERFACE UNITS

INTUITIVE & CUSTOMIZABLE SOFTWARE

ONE PARTNER MANY SOLUTIONS!



LOCAL PRESENCE





MARVAL

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COMPANY DATA

Contacts

Stefano Mauri - Sales manager

COMPANY PROFILE

MARVAL, since 1985 advanced insulating glass solutions and technologies

MARVAL was founded in 1985 in Mariano Comense (Como, Italy), in the heart of the Brianza industrial area and today it's managed by new owners who have planned an industrial path for a strong relaunch.

Over the years it has become a worldwide point of reference in the Insulating glass sector.

Marval was born as a mechanical workshop and was brought to success thanks to the determination and experience of its staff in designing simple and reliable machines with excellent technology.

Today, Marval uses all the advanced technologies in the production of insulating glass, producing machines and equipments that are appreciated and exported all over the world. Everything about Marval is planned, manufactured and tested in the new headquarter in Villa Guardia (Como).

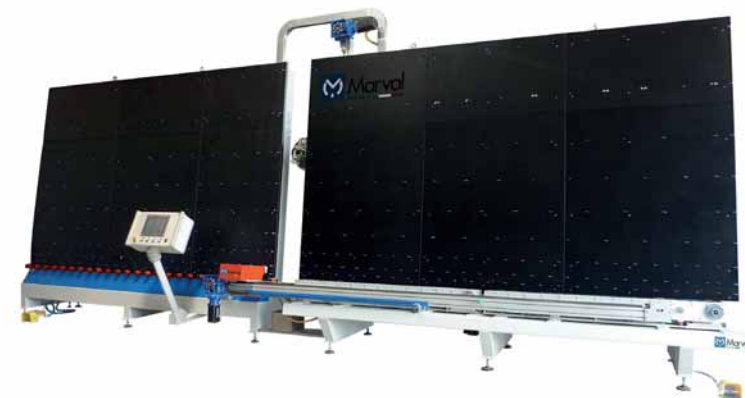
PRODUCT RANGE

Today Marval offers a wide range of products:

- vertical and horizontal washing machines;
- automatic panel presses with gas;
- automatic sealing robots;
- complete semiautomatic and automatic lines;
- automatic profile bending machines;
- automatic dessicant filling machines;
- butyl extruders;
- manual single component and two components extruders;
- accessories;
- special and customized installations.



Automatic insulating glass line



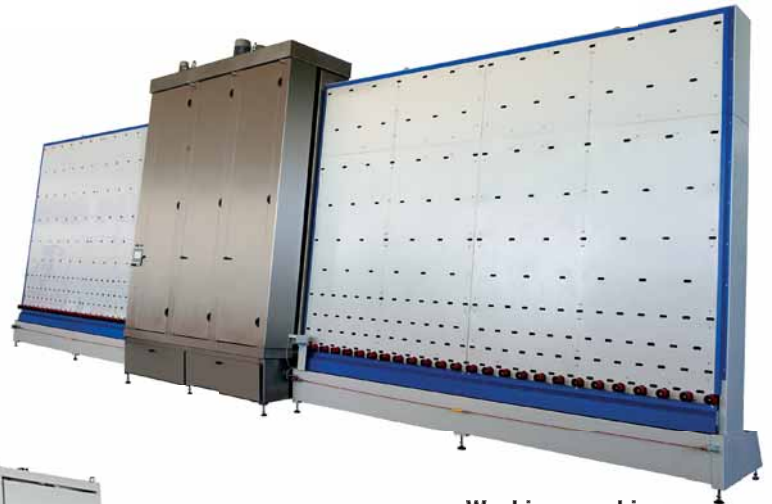
Automatic Sealing Robot



Butyl Extruder



Automatic Sealing Robot



Washing machine



Panel Presses

Automatic profile bending machine



Turning table





MAZZAROPPI
HIGH PERFORMANCE. ALWAYS



MAZZAROPPI ENGINEERING Srl

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Tel.: +39 06 92854602 - Fax: +39 06 92730082

E-mail: sales@mazzaroppi.com • www.mazzaroppi.com

COMPANY DATA

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Federico Mazzaroppi - Marketing Manager
Michele Spano - Service Manager

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SPAIN

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BELGIUM AND THE NETHERLANDS

PIETERMAN GLAS- EN STEENTECHNIEK

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UK

STONE AND GLASS GROUP

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USA

MATODI INDUSTRIAL LLC

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COMPANY PROFILE

Since 1958, **MAZZAROPPI** has been offering companies exactly what they need for glass tempering: patented technologies that guarantee high performance and low consumption. This is why Mazzaroppi solutions today guarantee the highest energy efficiency on the market, with consumption up to 70% lower than the competition and top performance.

For us, sustainability means looking to the future, protecting the environment and supporting the development of companies of all sizes that choose our hardening furnaces and equipment. Mazzaroppi machines are designed according to the Energy Saving Approach, an innovative concept focused on energy saving and integration with Industry 4.0. We use the best materials for the construction of each oven, guaranteeing a life cycle of more than 30 years. Our specialised team is always ready to assist our customers to ensure that their Mazzaroppi oven is always at the top of its game and that their work never stops.





FOUR MAZZAROPPI TECHNOLOGIES REVOLUTIONISE GLASS TEMPERING

ENERGY-SAVING SOFTWARE

The intelligent software that manages every Mazzaroppi plant is focused on increasing efficiency and not only on temperature control, with very low power dissipation. Thanks to the Power Saving Software, it is possible to achieve huge savings in terms of energy and costs in the production process by limiting the absorption peaks.

INTELLIGENT HEATING ZONE

The multi-zone control system divides the upper and lower heating chambers into many small independent zones, each with its own heating element and thermocouple. Thanks to complex optimisation algorithms implemented in the software, the system automatically recognises which areas of the furnace are occupied by glass and in what percentage, switching them on according to actual requirements, limiting current peaks and also favouring the immediate possibility of changing the thickness.

START&STOP FUNCTION: FROM 20° TO 680° IN 1 HOUR

Thanks to the quick start system (just in time), Mazzaroppi furnaces go from 20° C to 680° C in just 30 minutes in the days following the first start-up.

It is therefore possible to completely shut down the system every day, reducing non-productive costs to zero (unlike conventional hardening furnaces). This performance is achieved by using low absorption materials and a low thermal mass inside the oven, which is designed to absorb high and continuous temperature variations. There is no inherent problem with the expansion of components inside the oven, nor with the classic chalking of insulation materials.

97% REDUCTION OF ANISOTROPY

All Mazzaroppi systems, thanks to the automatic multi-zone control, the eco-convention system and the intelligent software, are able to minimise the temperature difference zones (ensuring the most uniform heating and cooling of the glass sheets). The results are incredible: a reduction in anisotropy of up to 97%.



**How much could you save with Mazzaroppi technologies?
Scan the Qrcode and find out with the Energy Saving Check**



MOLE MORESCHI

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1921-2021
**NEVER
GIVUP** **100+3**

COMPANY DATA

Contacts

Marco Moreschi - Owner

Barbara Doda - Sales Department

Michele Cesaretti - Sales Department



COMPANY PROFILE

Mole Moreschi has know-how and direct experience in the production of diamond wheels and tools for glass processing, that are the result of more than 100+3 years of production. The company was first in the production and development of the resin wheels and, today, Mole Moreschi has a complete range of standard and special tools for the glass industry, with very high quality.

Some Italian and international glass machinery manufacturers have chosen Mole Moreschi as their preferred partner and found that the company's wheels have the best reliability and constant quality. This means that tools can be tested and new products developed to increase machine performances. Mole Moreschi uses the most advanced technologies in tool

production to guarantee the highest quality level possible.

The research and development activities of the company are dedicated to improving tool quality and guaranteeing production level.

Mole Moreschi's target is to maintain this very high level of quality, while guaranteeing the highest possible performance of customers' machines.

Mole Moreschi is always available to study and manufacture tools as per specific customers' requests for special production.

The company's sales and distribution network is a winner not only for the quality and timing of service, but also with regards to the technical knowledge of its distributors who can assist and suggest the best tools.





NEPTUN Srl

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COMPANY DATA

Contacts

Stefano Bavelloni - Director of Operation
Matteo Rolla - Finance & Sales Director
Fabio Palella - Sales Manager

Sales

Domestic (10%) / International (90%)

Area

Production unit 4000 m²

Planned Exhibitions 2024

China Glass: Shanghai, China - 25 / 28 April
Glasstech Mexico: Guadalajara, Mexico - 9 / 11 July
GlassBuild America: Dallas, USA - 30 September / 2 October
Glasstec: Düsseldorf, Germany - 22 / 25 October
Eurasia Glass: Istanbul, Turkey - 16 / 19 November
BIG 5 - Gulf Glass: Dubai, UAE - 26 / 29 November

SALES NETWORK

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UNITED KINGDOM & IRELAND

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ROMANIA

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MIDDLE EAST

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SOUTH AFRICA & NAMIBIA

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PHILIPPINES & SRI LANKA

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THAILAND

Leotech
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COMPANY PROFILE

NEPTUN Srl was founded in late 2008 as a machines and equipment manufacturer for flat glass cleaning. It quickly established itself thereafter as a key player for creating solutions for glass processing. Neptun's Mission is to produce new technical solutions that can provide a competitive advantage to its customers - for which it invests more than 12 percent of its turnover in Research and Development. Together with its sales distribution, the company's customer support is strengthened by its network of experienced collaborators. Neptun stands out as an ideal partner for all glass industry companies that require proven quality, performance and reliability. The company has a trio of product lines, namely straight-edging machines, washing machines and vertical NCs for drilling and milling. All three have a full range which spans both width and depth, while each can be fully-integrated - whether in-line or thanks to the company's anthropomorphic 'Bravo' series manipulators.

QUICK SERIES

Neptun has the widest range of vertical NCs on the market for drilling/milling and glass grinding for any type of processing and company size. From the entry-level milling machine to the latest generation fully-automatic Quick2 T10, up to the brand new Quickedge, the Quick series includes over 10 models that can work individually or combined in line.

Neptun offers work solutions from the small glass shop to the industry that works 24/7 with the NC machines inside robotic cell.



ROCK

Neptun's line of straight line edgers is the very definition of tradition and innovation - being characterized by a truly robust structure in thick steel and cast iron which guarantees long-lasting reliability. Rock also offers many patented solutions and cutting-edge functions, ETS squaring systems, the RC-4 for parallelogram processing and, lastly, the AWA version for fully-automatic wheel management.



WASHING MACHINES

As for glass washing, Neptun displays its expertise in a wide range of available washers. The company offers 3 horizontal washing machine models, namely the economical TORNADO EASY, the HP for high performance and the HP-S series for special applications (solar, ceramic ink, ultra-thin glass, medical). Neptun further proposes 4 vertical washer models - from the economical LV Top, going up in performance and automation terms to the LV EVO model and Wave before finally rising to the top-of-the-range, super-equipped standard Superinox.





LUOYANG NORTH GLASS TECHNOLOGY INDUSTRIAL CO., LTD.



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COMPANY DATA

Contacts

Gao Xueming - Chairman
Gao Li - President
Johnny Li - Sales Director

Mother company

Luoyang North Glass Technology Industrial Co., Ltd.

Area

Offices 500,000 m² / Production Unit 35,000 m²

Annual turnover of the Group

Euro 190 Million

Annual turnover of the Company

Euro 73 Million

Percentage of turnover form glass (%)

38%

Percentage third-party turnover (%)

62%

Sales

National (70%) / International (30%)

Quality Certifications

CE, EN14179, IGCC, SGCC, CSI

Number of Employees

2200

Founding Year

1995

Paid-in Capital

Euro 91 Million

Registered Patents

390 patents

Registered Trademarks

NorthGlass

Parent and Sister Companies

CHINA

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Shanghai North Glass Vacuum Coating Technology Co., Ltd.

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Tianjin North Glass Industrial Technical Co., Ltd.

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Luoyang North Glass Light-Stone Technology Co., Ltd.

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E-mail: bbqjs@northglass.com

COMPANY PROFILE



“LUOYANG NORTH GLASS TECHNOLOGY CO., LTD.”, simply called as “**NORTHGLASS**”, was established by Mr.Xueming GAO, Chairman of the Board, in Luoyang National High & New Technology Development Zone on 18th May, 1995. In 2011, NorthGlass created a precedent in glass deep processing machine industry, going public at Shenzhen Stock Exchange (stock code: 002613). After this, NorthGlass has set up 9 other subsidiaries.

Adhering to the corporate culture of “Innovating forever, Striving for success”, NorthGlass has independently developed and manufactured its products with core competitiveness, such as glass tempering furnace, coating line, high-end deep processed glass, etc. Based on this, NorthGlass has further expanded its products in other industries such as glass deep processing automation line, glass cutting machine, storage system and trituro fan. At the same time, NorthGlass invests in the successful incubation of NorthGlass Light-Stone industry, preempting the layout of new wall materials for assembly-type green buildings.

NorthGlass is one of the strongest and leading enterprises in the industry of R&D and manufacturing of glass deep processing equipments. Its leading product, flat and curved glass tempering furnaces, have been in the forefront of the industry for 22 consecutive years since its annual production and sales volume exceeded 100 sets in 2002, and more than 5,900 glass tempering furnaces have been in operation around the world. Its self-developed coating line has become one of the mainstream production

equipments in the global glass coating industry, driving the rapid development of China’s glass coating industry.

Another pillar industry, deep processed glass products, are also used in national and regional landmarks buildings such as China “National Center for the performance arts”, National Stadium “Bird Nest”, National Swimming Center “Water Cube”, National Speed Skating Oval “Ice Ribbon”, National Convention Center, Beijing Daxing International Airport, “Sun Valley” & “Shiliupu Pier” of EXPO 2010 Shanghai, main venue of G20 Hangzhou Summit, main venue of Xiamen BRICS Summit, main venue of SCO Qingdao Summit, National Development Bank Headquarters, Beijing South Railway Station, Shanghai Tower, Japan Sport Olympic Square, UK Leadenhall Building, Abu Dhabi International Airport, US Oracle’s Campus in Austin, Nike Shanghai 001, Huawei global flagship store in Shenzhen, etc. Meanwhile, NorthGlass is also one of the two main suppliers of architectural glass to the world famous electronics company for its flagship stores around the world and its headquarters in Silicon Valley.

NorthGlass products are all over the country and exported to more than 110 countries and regions such as USA, UK, Germany, France, Japan, India, Brazil, Saudi Arabia, Egypt, Turkey, etc., supported by a comprehensive domestic and international sales and service system.



NorthGlass has various kinds of internationally advanced complete equipment & laboratories for the tests of tempered glass and low-E glass. The company has been awarded the “Top Brand of Architectural Glass”, “Preferred Brand of Top 500 Chinese Real Estate Development Enterprises”, “Industry Influential Brands Top List” by the industry associations. Tianjin NorthGlass has been

awarded the title of “Outstanding Contribution to the Industry” in the 40th Anniversary of Reform and Opening-up. “NorthGlass” has been recognized as a National Famous Trademark in July 2017. The Chairman, Mr.Xueming GAO, has been honored as the “Representative Person of National Building Material Industry in the 30 Years of Reform and Opening-up”.





OPTRIS GMBH

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COMPANY DATA

Contacts

Ulrich Kienitz - General Manager
Torsten Czech - Head of Marketing
Ingo Stahlkopf - Head of Sales

Number of Employees

115

Company founded

2003

Planned Exhibitions 2024

Glass South America - São Paulo, Brazil - 12 / 15 June
Glasstec - Düsseldorf, Germany - 22 / 25 October

SALES NETWORK

OPTRIS HEADQUARTERS

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sales@optris.com - www.optris.com

USA

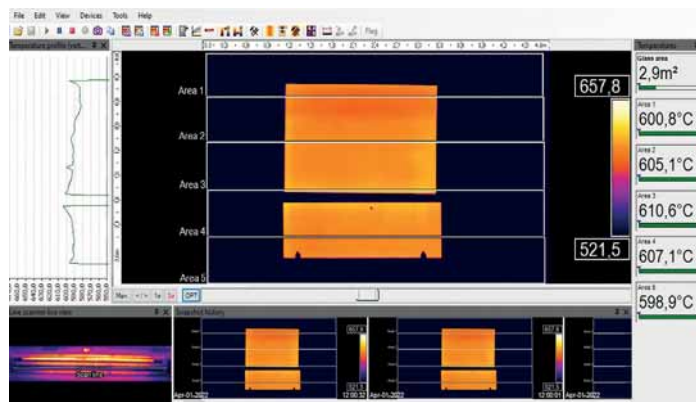
Optris Infrared Sensing

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Tel.: +1-603 766-6060
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CHINA

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COMPANY PROFILE

Optris is and has been, one of the leading innovative companies in the field of non-contact temperature measurement by means of infrared radiation since its establishment in 2003. The company's product range covers fixed industrial thermometers, infrared cameras, as well as accessories.

TRADITION AND INNOVATION

Thanks to their extensive know-how and innovative concepts, our experienced engineers and physicists continuously inspire with outstanding solutions.

TOP QUALITY AT REASONABLE PRICES

We provide cutting-edge infrared technology. Cost advantages arising from bulk purchasing of semiconductor products and from the production process are passed directly on to our customers.

PROCESS OPTIMIZATION VIA TEMPERATURE MONITORING

In many manufacturing processes (e.g. the glass industry), product and process temperatures are important physical variables. Non-contact temperature measurement with Optris sensors and thermal imaging cameras ensures high production line quality standards.

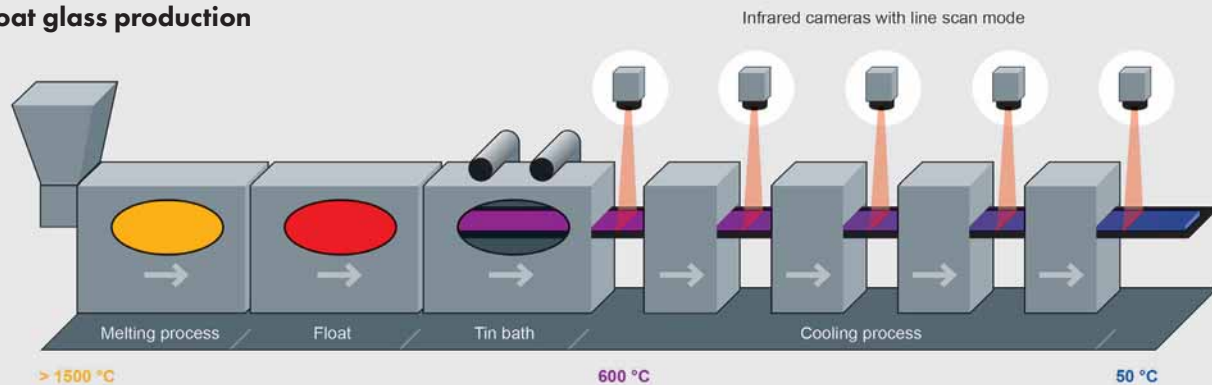
In order to ensure the highest level of quality, the glass industry and its energy-intensive production process relies on dependable means of temperature monitoring.

Our glass thermometers and IR cameras are optimally suited to non-contact temperature measurement of glass surfaces and use innovative double lasers to indicate the exact measurement spot.

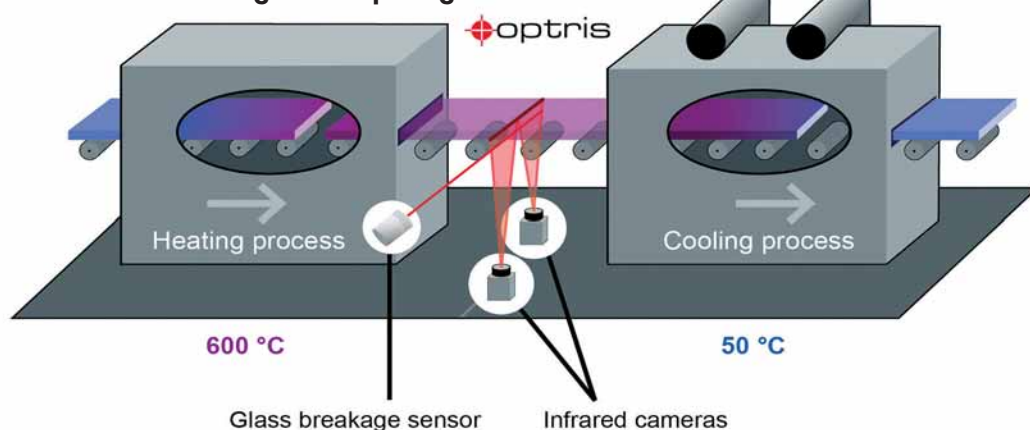
All kinds of glass, coated and uncoated, change their emissivity behavior in dependency of the angle of view. Especially low-E coatings show an unusual behavior. The new Bottom Up Glass inspection system solves this problem by having two infrared imagers installed underneath the tempering line which measure the temperature on the non-coated high emissivity side of the glass.

Thermal image of monitoring temperatures of glass sheets

Measurement areas at float glass production



Solutions for low-E glass tempering



mal treatment, which is ensured by the application of the correct temperature measurement technology.

Ensuring the quality of laminated safety glass

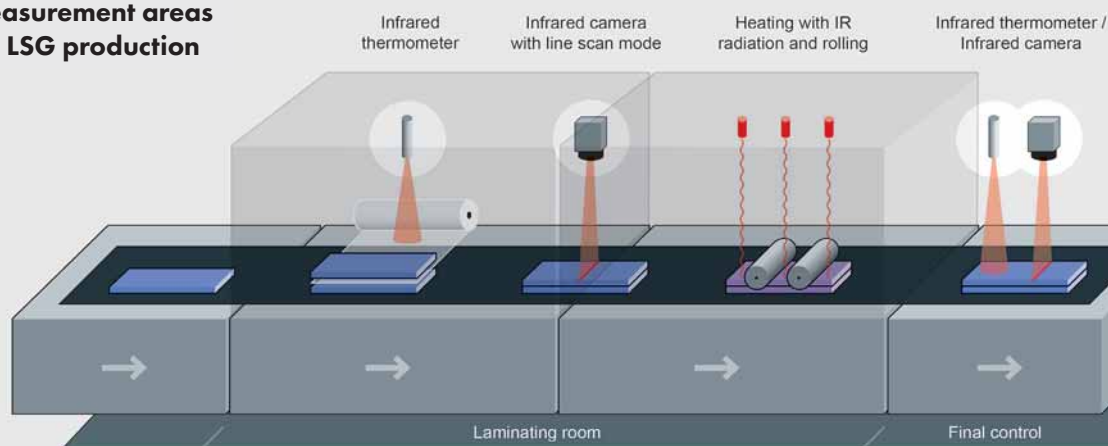
Laminated safety glass (LSG) consists of at least two flat panes of glass, which are laminated in a clean room with a sheet of PVB film between them. The temperature of the film can be monitored with infrared

Single-pane safety glass production with correct temperature measurement technology

For the production of single-pane safety glass (SPSG), the cut and processed flat glass is heated in a furnace under continuous movement at over 600°C. During the transport of the heated glass in the pretension zone, an infrared camera monitors the temperature distribution on the glass surface in line scan mode. Inhomogeneities can thus be compensated during the tempering process, in which the glass is air-cooled. The quality of the SPSG mainly depends on a homogeneous ther-

ermometers. In the pre-heating furnace, the glass panes are heated in order to melt the film and simultaneously press the "sandwich" together, to prevent air pockets. During the transition to the autoclaves, the temperature distribution is monitored with an infrared camera, in order to adjust the heating elements in the pre-lamination furnace for subsequent panes, when necessary.

Measurement areas at LSG production





R.C.N. SOLUTIONS Srl

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COMPANY DATA

Contacts

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Davide Ricchi - Owner - R&D Department

Simone Vecchi - General Manager

Roberta Cometti - Communication & Press Manager

Annual Company Turnover

EUR 5,500,000

Percentage of Turnover from Glass

80%

Percentage of Third-Party Turnover

20%

Sales

Domestic (20%) / International (80%)

Area

Offices 500 m² / Plants 2000 m²

Founding Year

1993

COMPANY PROFILE

R.C.N. SOLUTIONS is a manufacturer of machinery focusing attention on Made in Italy and giving priority to quality, assistance and care for details.

The company seeks to focus on the importance of keeping active and supportive to give customers the utmost cooperation. Great flexibility in customization, together with the ability to innovate, are two of the main strengths that make RCN different from other market choices.

Laminating glass > A quality product is the combination of different elements supplied by RCN: kiln, REVA BF interlayer, RD CLEAN CONCEPT PATENTED, EASY CONNECT APPLICATION.

They are fundamental elements to grant precise laminations at top level. Especially, remote control of our installed machines and of the production process, in case of doubts, input of recipes and general assistance, allows a tight cooperation together and assures a supportive post-sale service.

Our know-how and our skills have generated a multi-layered experience based on creativity, method, quality standard and the desire of constant renewal.

We generated a know-how embodied by machines that are solid, durable, and succeed in tasks that prove impossible for others.

RCN production includes laminating kiln and interlayer, bending kiln, chemical tempering lines and the last news: RD CLEAN CONCEPT – PATENTED SYSTEM. The last generation laminating bag manufactured with special materials selected for a special purpose: to limit the overflow of the interlayer from the edges of the laminated glass.

NEW: Multiplied – laminating kiln that can be composed in oversize, over 6 metres.

“RIVA by RCN” chemical tempering furnaces

“RIVA by RCN” – the chemical tempering line under the name of “RIVA by RCN”, has now particular importance for the production of special products for the aviation and naval industry; for electronic devices, optical instruments but also for some architectural installation. Based on an over 40-year experience and technical expertise of Mr. Gianfranco Rivaroli,





“Riva by RCN” is a double winning solution with the possibility of customizing the machines according to production requirements. The small model CT80S is particular suitable for both laboratory test but also for those companies who want to approach the chemical tempering, experimenting on small scale before deciding to invest for bigger. All RCN machines are manufactured with an eye on energy saving and do not need high power and consumption is very limited.



POWERLAM and LAMMY SYSTEM laminating furnaces

Launched in 2008, with the aim of allowing fast lamination, Powerlam line, it is a range of special machines for lamination in 35 minutes, allowing several companies for rapid lamination of series.



bending furnaces

The important comeback in the request for bending furnaces has enabled RCN to start-up and up-grade its production of bending furnaces, now with the possibility of customization and an increase in the number of independent heating zones, a fundamental feature to enable to carry out more complex bending, thanks to independent controls and temperature zones. Curved glass is becoming more and more important, for scientific purposes too. Curved glass is becoming more and more important, for scientific purposes too. New project for bending loop system is under construction.



REVA BF lamination interlayer

Exclusive chemical formula to combine adhesion quality, high transparency rate and product constancy, thanks to the choice of fresh raw materials supplied by one of the most prestigious international chemical companies and production controls and inspections. REVA BF has been validated by international certifications Institute by Rosenheim Iff too.

| | | | |
|-------------------------------------|--|-------------------------|--|
| | | | |
| SGCC List Approved | | UNI EN ISO 12543-4:2011 | |
| AINSI Z 97.1-2009; CPSC 16 CFR 1201 | | UNI EN 12600:2003 | |
| AINSI Z97.1-2015 Section 5.4.2 | | | |

Rollmac®

Gemata®



ROLLMAC A DIVISION OF GEMATA SpA

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Mother Company

GEMATA SpA

Sales

Domestic (13%) / International (87%)

Quality Certifications

ISO9002, 14001, 9001:2000

Number of Employees

111

Founding Year

1979

Planned Exhibitions 2024

- Glass South America** - Saint Paul, Brazil - 12 / 15 June
- GlassBuild America** - Dallas, USA - 30 / 02 October
- Glasstech** - Düsseldorf, Germany - 22 / 25 October
- Glassexpo** - Istanbul, Turkey - 16 / 19 November





COMPANY PROFILE

ROLLMAC is the branch of Gemata Spa, primary group in the leather finishing manufacturing sector, devoted to the production of machinery for the enameling and satin-coating of flat glass. Its specific expertise, acquired over years on the global market, means it can offer the final user a complete know-how service and support from individual machines to complete lines. All the products are designed in-house by the R&D division and tested both internally and later at the premises of those clients with whom it has established close cooperation.

Production

Gemata/Rollmac creates complete systems that integrate the "GlassLine" system, for coating of the edges of glass sheets, "Multiglass" for coating the entire glass sheet, and the IR drying furnace "GlassDrier IR". The latest innovation launched on the market is the Jumboglass machine for the enamelling of float glass sheets "jumbo" size.

According to specific factors such as production needs, sheet size, and high automation levels requirements, a wide range of accessories and options are also available.

In compliance with current standards, all Rollmac machines come with remote assistance as standard, thereby meeting the requirements for Industry 4.0.



Rollmac-Gemata is certified as per ISO 9001, ISO 14000, and Italian "Safe Work" standards.

SATINAL



SATINAL SpA - TK - STRATO

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COMPANY PROFILE



Satinal Spa is an innovation-driven Italian Company, operating worldwide to deliver **advanced solutions for safety glass manufacture**.

The deep knowledge of glass processing technologies has allowed Satinal Spa to expand globally: it has branches abroad including United Arab Emirates, North and South America, beside the headquarter and manufacturing plant in Italy.

Today Satinal Spa is a global leader in the development, manufacturing and commercialization of glass laminating solutions, both from a machinery standpoint and from the made in Italy laminating interlayers perspective.

Close to its customers and partners, Satinal offers customized and innovative solutions, and after-sales technical services.

Quality, honesty, transparency and respect are the main ingredients of Satinal everyday life. Primary assets are people and their value. This inspiration drives Satinal approach to business, innovation and quality.

Satinal's vision has driven towards the search for an **economi-**

cally and environmentally sustainable energy solution.

Raising awareness of these issues and striving to respect and protect nature are topics considered as a moral and social obligation. Satinal has been planning **investments** with respect to environmental sustainability, reduction of harmful emissions and energy efficiency.

In 2022 STRATO[®] achieved **ISCC+ certification** (International Sustainability & Carbon Certification), thanks to the introduction of **STRATO[®] EVA Carbon Free** product range. **STRATO[®] obtained the ISCC PLUS certification with a score of 1,13 [kg CO₂ eq] which is an extraordinary result compared with the 4.5 [kg CO₂ eq] of the best potential competitor.** And in 2023 STRATO[®] obtained the 100% Made in Italy Certification, aimed at guaranteeing Italian origin and product quality and the **EcoVadis Platinum medal**, proving **Satinal progress** in the ESG goals. A recognition of the great steps taken so far by Satinal and the promise to go on in the same direction, keeping the same dedication and commitment.

STRATO®

Satinal Spa is the first EVA film production site in Italy, a reference point in Europe for the supply of 100% made in Italy STRATO® EVA interlayers.

STRATO® EVA film is a thermosetting material. Thus, it is significantly different from the **PVB film** (Polyvinyl butyral), which is a **thermoplastic material**. The **EVA film** creates three-dimensional bonds at molecular level during the lamination process. The **interlayer** is not sensitive neither to humidity nor to temperature, therefore it is not necessary to store it under controlled humidity and temperature conditions. Being a cross-linking material, **STRATO®** can be used for **laminating safety glass** for both **architectural** and **interior design applications** without running the risk of de-lamination and yellowing over time.



TK

TK is specialized in the design and construction of plants and ovens for glass lamination, temper, chemical temper and Heat Soak Test. The wide range of **TK products** meets the needs of **medium and large companies** that need to start production or increase their production capacity and improve the quality performance of the finished product.

Working in close collaboration with customers, TK relies exclusively upon the **best Italian technology and European**

components to meet its high quality and standards requirements - providing 100 percent customized solutions.

In seeking to best provide the most appropriate and personalized solutions, TK applies a tested methodology that relies upon great attention to all steps: briefings on customer requirements, made to measure solutions, equipment design and development right up to on-site, remote and local installation, staff training and aftersales assistance.





OFF. MECC. SCHIATTI ANGELO Srl

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COMPANY DATA

Contacts

Angelo Schiatti - President
Cinzia Schiatti - Sales Manager
Emanuela Schiatti - Account Manager
Alessandro Schiatti - Technical Manager

Sales

Domestic (25%) / International (75%)

Number of Employees

46

Founding Year

1950

Planned Exhibitions 2024

Glass South America - San Paulo, Brazil - 12 / 15 June

Glasstech Mexico - Guadalajara, Mexico - 9 / 11 July

GlassBuild America - Dallas, USA - 30 Sept. / 2 October

Glasstech - Düsseldorf, Germany - 22 / 25 October

Eurasia Glass - Istanbul, Turkey - 16 / 19 November

COMPANY PROFILE

The Schiatti Elia company manufactured the first glass machine in 1950.

Today the **SCHIATTI ANGELO** (Angelo is Elia's son) designs and produces, for Small, medium and large glassworks from furnishing, construction and photovoltaic sectors, a complete range of glass processing machines, including:

- 7 models of straight grinding machines for the processing of pencil, flat and arris, ogee and waterfall edges. Cerium oxide finishing.
- 25 models of straight-edge grinding machines for the processing of flat edges and arris - 45° mitres - cerium oxide polishing on the edge.
- 16 models of double edging machines for the processing of polished pencil and flat +arris profiles, available in different sizes.
- Corner machine for the production of variable radii or cant corners.
- Straight-edge bevelling machines for the processing of bevels from 0° to 45° - with cerium oxide polishing.
- Glass loaders/unloaders especially suitable for medium/large glass



companies for coupling with horizontal edging or drilling machines.

- Drilling machines with opposite heads suitable for the production of mirrors, shelves for furniture, laminated glass, tables tops and household appliances.
- Multi-head drilling machines for the execution of 2, 3 or 4 holes at the same time. Especially suitable for the production of mirrors, shelves for furniture, laminated glass and household appliances.
- Vertical drilling machines for the execution of holes and notches. Especially suitable for medium/large glass companies for the production of mirrors, shelves for furniture, laminated glass,

table-tops, household appliances and doors.

- Special machines such as complete vertical grinding lines composed of 4 straight edgers and 3 turnover units for the complete processing of the 4 sides of the glass, drilling centers customizable according to customers' needs and special solutions for smart factories.

Reliability, innovation, service, sustainability are the features that distinguish our way of work and our machines.

Those who choose us do so for the attention we dedicate to the real needs of our interlocutor, even for after-sales service (periodic maintenance, revamping), for a high-performance and innovative technology, always aimed to best adapt the circular economy and the industry 4.0.



Automatic straight edging line mod. TURNOVER



Straight grinding machine mod. SME10

Vertical milling/drilling machine mod. TFFV2000



SALES NETWORK

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SCHIAVO Srl

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COMPANY DATA

Contacts

Michele Schiavo - General Manager

Percentage of turnover from glass (%)

100

Sales

Domestic (20%) / International (80%)

Founding Year

2003

COMPANY PROFILE

Products

SCHIAVO machines are well-known in the market for their quality, reliability and advanced technology. As of today, more than 5.000 machines have been installed in over 50 countries. Every machines are 100% Made in Italy with 100% high-quality European components.

Washing machine

SCHIAVO horizontal and vertical washers have been developed to offer high-quality and high-performing machines, for clients requiring affordable and quality machinery. Our washing machines can be equipped with 2 to 6 brushes or more, and are made entirely of stainless steel.

Milling - Drilling machine

Very precise and CNC controlled, the new FV1000 model is a vertical machines very versatile in order to obtain each and every type of cuts, notches and holes needed for the installation of hinges, handles, locks and accessories on glass doors and glass furniture. Our machine is industry 4.0.

Storage systems

Glass storage systems are essential for glassworks to organize production efficiently and to optimize available space.

PRODUCT RANGE

- Vertical and horizontal washing machines
- Manual, Semi-automatic, Automatic Storage Systems
- Vertical Milling Machines
- Vertical and horizontal drilling machines
- Fixed, Manual, Motorized Vacuum Lifters
- Manipulators
- Unloaders for packs



HYDRO



FV1000 vertical milling machine

In this area, SCHIAVO is a leader, with highly reliable solutions for the needs of its clients. CLO is a sideways-moving storage system available in manual or semiautomatic version.

UCS is the new, ultra-compact, ultra-low storage system for glass sheets and offcut glass, patented by SCHIAVO.

Vacuum lifters

SCHIAVO offers a wide range of products to lift glass sheets: from simple clamps to vacuum lifters (manual, motorized or hydraulic) for all kinds of flat glass including IG glass, manipulators, jib cranes, package unloaders.



Horizontal glass washing machine HTL2600



GEBI



SKILL GLASS Srl

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COMPANY DATA

Contacts

Beniamino Dal Santo - President
Matteo Dal Santo - Sales Manager
Andrea Dal Santo - Technical Manager

Sales

National (20%) / International (80%)

Founding year

1999

Planned Exhibitions 2024

China Glass - Shanghai, China - 25 / 28 April
GlassBuild America - Dallas, USA - 30 September / 2 October
Glasstec - Düsseldorf, Germany - 22 / 25 October
Eurasia Glass - Istanbul, Turkey - 16 / 19 November

COMPANY PROFILE

SKILL GLASS is specialized in the manufacture and design of high technology numerical control machines for the processing of flat sheet glass, which, combined with special software with dedicated functions and modern and functional design, are simple and quick to use. From their head offices in Schio (VI), in the north of Italy, the company designs and creates advanced solutions, focusing on the intuitive and practical machines with high technology, that are innovative and at the top for quality and ease of use.

SKILL GLASS has created the best expression of vertical processing, promoting optimal use of space for the glass industry. Machines that are particularly appropriate for large production of architectural and structural glass and that have the strongest features and best advantages on the vertical glass processing sector.

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

VERTICAL CNC CENTERS

SKILL E-D is the vertical CNC center for grinding, milling, drilling and polishing rectangular and shaped flat sheet glass. The machine can process both rectilinear and shaped flat sheet glass

and combines all the technology for vertical drilling and milling with the features of a vertical grinding machine. Its main feature is its versatility, which allows for different types of processes at high speeds and optimal precision.



DRILLING AND MILLING

DRILL 1600FF is a 5-axis CNC drilling and milling machine designed for producing holes, inserts and countersinks on rectangular flat sheet glass with a thickness of 3-20 mm. The machine

is composed of five axes, X Y V Z W, and two electro-spindles which, as opposite drilling heads, create a double-sided drilling system that drills perfect holes.



GRINDING, ARRISING AND POLISHING

SKILL SFILL is the vertical center for arissing, grinding and polishing straight and shaped glass panes.

The machine is composed of nine axes and two electro-spindles mounted in parallel, allowing to process the pieces with two heads at the same time.

Edging is done using diamond wheels with a diameter of 150mm and can be carried out on straight and shaped glass, including laminated or treated glass.





TALAMONI Srl

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COMPANY DATA

Contacts

Tomasino Talamoni - Owner - Production Director
Rosella Mitidieri - Owner - Sales Director
Laura Broggio - Export Sales Manager
Elisabetta Talamoni - Production Manager
Omar Bettini - Technical Manager

Sales

Domestic: 60% / International: 40%

Banks

Banco Popolare

Paid-in capital

EUR 20,000

Area

Offices 100 m² / Plants 150 m²

Founding year

1994

Planned Exhibitions 2024

Glasstec - Düsseldorf, Germany - 22 / 25 October

COMPANY PROFILE

An Italian partner for cutting tools known worldwide

TALAMONI was founded in 1994 and is specialized in the production of cutting tools in hard metal for the glass and ceramics industry.

Craftsmanship, flexibility and customer focus are all Talamoni's strong points. Thanks to our well-stocked warehouse, your order for any destination in the world leaves today.

The know-how of the owner, together with his young dynamic organisation, has enabled the company to grow and to make an impact on the market. Today, Talamoni is a trusted and proactive partner for many companies, with 50% of its turnover coming from exports.

Raw materials and Operations, Quality Standards

Talamoni cutting wheels and discs, sintered with state-of-the-art

technology are turned by machines that guarantee consistent high-quality batches.

In the quality assurance unit, the physical characteristics of materials, metallurgical properties and all stages of production up to finished products, are examined before being assembled into tool-holders also produced by Talamoni, so as to guarantee ready to use and performing cutting heads.

The "Diamant" line of wheels is produced in various sizes and finishes depending on the type of glass to be cut. The advantages of using "Diamant" wheels are multiple: better quality of cut, easy breakout, triple lifetime and the same cutting angle allows greater thicknesses to be worked.

Talamoni is delighted to be presenting its cutting tools at Glasstec 2024.



Talamoni products are used in the following fields:

FLAT GLASS PROCESSING

- wheels in hard metal with diameter of 3.0 to 12.4 millimetres for automatic- or semi-automatic cutting tables, available with angles from 90° to 165° for cutting monolithic, stratified, laminated, and special glass.
- plastic wheel holders with various wheel models, suitable for installation on Bystronic, Bottero, Bavelloni, CMS, CSM, Euromec, Hegla, Intermac, Lisec, Gfpm, Macotec, OCS, Turomas cutting tables...
- wheel holders in metal or steel in various models for all cutting tables, CNC-controlled machines and hand-held cutters on the market.
- metal modules complete with wheels for safe, fast and secure tool changes.



LUBRICATION

Talamoni cutting fluid mixtures are formulated to guarantee ideal lubrication of the cut and to optimise the working lifetime of the wheel, the oil enters the cut, maintaining the tension of the glass, facilitating the opening of the cut easy.

Talamoni offers four different types of synthetic fluid for cutting glass:

- T-OIL 3125 for cutting thick glass – low volatility;
- 3130 T-OIL for cutting shaped glass – medium volatility;
- 3133 T-OIL for cutting monolithic glass – high volatility;
- 3232 T-OIL for magnetronic, stratified, coated glass etc. – super volatility.

All products are registered and checked to ensure safe a working environment in work areas and on cutting tables.



MANUAL CUTTING

The company produces a complete line of oil-reservoir cutters for manual cutting.

Various models of oil-reservoir hand-held cutters with handles in plastic or anodised aluminium all rigorously “Made in Italy”. Talamoni glass cutters are produced with wheels sharpened to different angles to satisfy diverse cutting requirements – the manual tools are destined for professional use in glassworks or artistic workshops.



HOLLOW GLASS PROCESSING

wheels in hard metal with diameters of 5.0, 5.6 and 6.0 are used for engraving hollow glass in automatic crack-off lines. Talamoni also produces tool-holders for these lines, as well as a series of diamond tools for edge processing and glass beakers.

TEXPACK®



TEXPACK Srl

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COMPANY DATA

Quality Certifications

ESA (European Sealing Association)
ISO 45001:2018 – Safety System Certification
ISO 9001:2015 – Quality System Certification

Founding Year

1993

COMPANY PROFILE

TEXPACK® is a manufacturer of packings, tapes, twisted ropes, cloths and sleeves for thermal insulation, for static use, and also manufactures special types of packing and braided packing for dynamic use for pumps and valves. The company manufactures and markets industrial gaskets of different types and sizes, offering a complete range of sealing systems and products for high temperatures, as well as a range of products for the maintenance of fireplaces and stoves dedicated to the consumer market. Texpack® was founded in 1993 as a result of the business experience of Giorgio Lanza and Simonetta Ghisi, who began specializing in the manufacture of textile products in glass, silica, Texil®, Biotex®, Thermaltext, Pyrotex®, Tenack and Aramtex® for thermal insulation at temperatures from 200°C up to 1,200°C. Since 1993, Texpack® has continued making constant and continuous investments, following the direction of technological research and using cutting-edge production methods. Texpack® has always looked towards the future, using speciali-

zed technical staff for each individual process. This strategy has led to its transformation from its first small premises to occupying its current production and commercial headquarters of over 10,000 sq.m., selling products in Italy and around the world. Since its foundation, the company has changed continuously with the market to meet the needs of customers, becoming an established reality. The company is deeply rooted in the local area, where, since its foundation, it has always maintained its corporate headquarters.

Texpack® continues to give the highest importance to its staff members, which are an integral part of the results achieved and an asset to the company. The success achieved is the result of the synergies, knowledge, abilities and skills of its staff. The combination of skills, their application and commitment, are one of the pillars of the company. Investment in training, refresher courses, specialized development courses, as well as courses regarding production techniques, is an on-going strategy of Texpack®. The best preparation and quality of its staff are a guarantee for the continual improvement of quality, products and services supplied by Texpack® to its customers.

Texpack® manufactures specific products for the glass industry, used in the production lines of glass bottles, flat glass and tempered curved glass mould coating.

Tenack products are ideal for covering stacker rods in the hollow glass industry and for lining moulds for the production of car windows, covering rollers and pipes in tempering furnaces, and in lamination furnaces for flat glass.

Aramtex® products are used in the industrial sector where extremely high mechanical resistance is required to running temperatures of about 350°C.



COD. 1204T Tenack square packing

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



COD. 1204CM Tenack knitted sleeves

Tenack sleeves are made by braiding AISI 316 L stainless steel wires. These sleeves, which withstand high temperatures and have excellent mechanical properties, are suitable for the glass industry as protection for parts that may come into contact with hot glass that is still soft, to prevent thermal shock and microcracks. They are an excellent substitute for Aramtex® products when temperatures exceed 350°C.



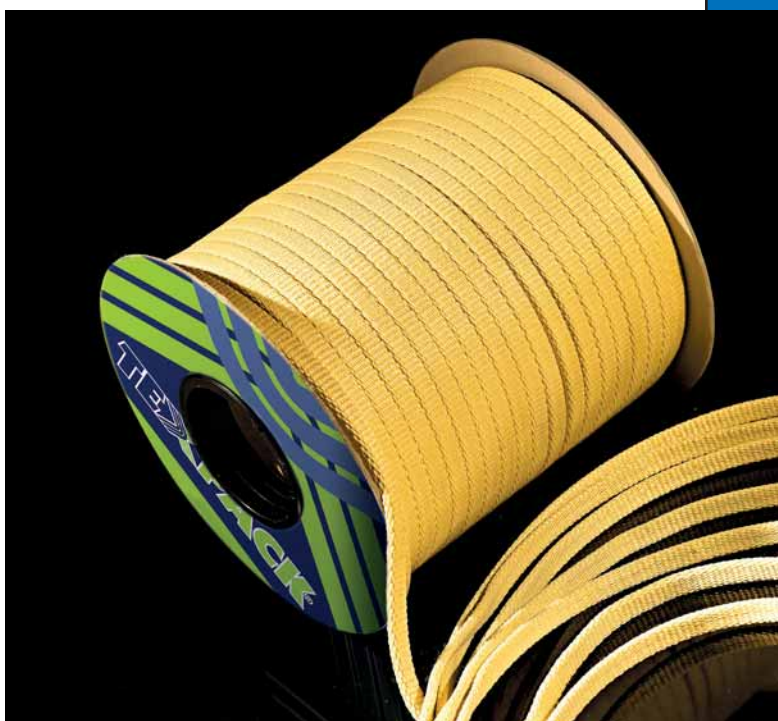
COD. 1203N PBI Tapes

PBI tapes are fire-retardant textile products made of PBI yarns, which are particularly suitable for high temperatures. To improve the use of this tape, a double-sided adhesive has been added, which helps to ensure correct positioning.



COD. 12010N Aramtex® discontinuous filament tapes

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





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COMPANY DATA

Founding year

1952

Sales

National (25%) / International (75%)

Percentage of third parties turnover (%)

5%

Percentage of turnover from glass (%)

95%

Patent obtained

no. 3 registered patents

Planned Exhibitions 2024

China Glass - Shanghai, China - 22 / 28 April

Glass South America - San Paulo, Brazil - 12 / 15 June

GlassBuild America - Dallas (TEX), USA - 30 Sept. / 2 October

Glassetec - Düsseldorf, Germany - 22 / 25 October

Eurasia Glass - Istanbul, Turkey - 16 / 19 November

COMPANY PROFILE

TRIULZI CESARE SPECIAL EQUIPMENTS srl is an Italian brand leading manufacturer of customized glass processing machinery.

Since 1952 starting as pioneer in the glass field is counting over 17.000 equipment placed all over the world.

A specialization, joined to a continuous future orientation, allows the Company to be an excellence reference point in terms of high quality, reliability, intensive productivity, durability on 3 shifts, sustainability.



PRODUCT RANGE

- EVERY KIND OF HORIZONTAL AND VERTICAL WASHERS FROM STANDARD TO FULLY CUSTOMIZED SOLUTIONS
- LAB WASHERS
- POLISHING WASHERS FOR PRE-COATING
- AUTOMATED LINES FOR FIREPROOF GLASS
- WPS (WET POWDERING SYSTEMS)
- ULTRASONIC CLEANING PROCESS
- AUTOMATIC SYSTEMS FOR CURVED GLASS
- HANDLING PROCESS ETCHED GLASS PLANTS
- LAMINATED GLASS LINE
- GLAZING PLANTS

Our background boasts several firsts (with patent recognition for some of our solutions) and is fueled by a strong inventive spirit. This passion was passed on to us by the founder, Cesare Triulzi, and has been a value shared by everyone in the company since the beginning.

We have always invested resources in R&D and are open to new technologies applied in other sectors.

Thanks to the well-established network of trusted agents and our help desk service & support, we fast intervene to respond to customer's request and to meet the specific needs of glassworks. To date the timeliness of technical interventions and diagnostics can count on sophisticated tools, predictive software and smart technologies capable of shortening times and distances, quickly arriving at the solution.

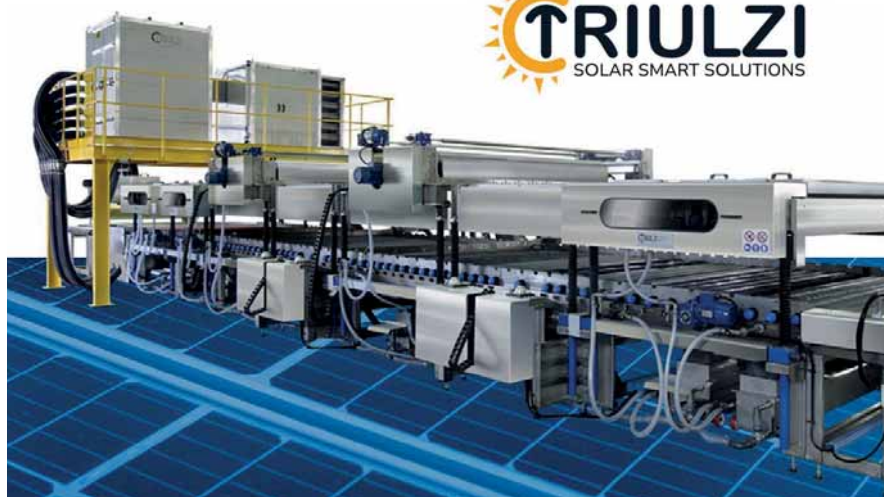
TRIULZI
E-CONNECT



TRIULZI
E-CONNECT



TRIULZI
SOLAR SMART SOLUTIONS



PACKAGING
packaging



GDO
gdo



DISPLAY
display



INTERIOR
interni



LIGHTING
illuminazione



HOME APPLIANCES
elettrodomestici



BUILDING
edilizia



AUTOMOTIVE
automobilistico



SOLAR
solare

TUROMAS

OUR PASSION, YOUR PROGRESS

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distecglass



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COMPANY DATA

Founding Year

1985

Registered brands

Tuomas

Planned Exhibitions 2024

- China Glass - Shanghai, China - 25 / 28 April
- Glass South America - San Paulo, Brazil - 12 / 15 June
- Glasstec Mexico - Guadalajara, Mexico - 9 / 11 July
- GlassBuild America - Dallas, USA - 30 Sept. / 2 October
- Glasstec - Düsseldorf, Germany - 22 / 25 October
- Veteco - Madrid, Spain - 5 / 8 November
- Zak Glass Technology - Dehli, India - 5 / 7 December



COMPANY PROFILE

Since 1985, **TUROMAS** has been manufacturing equipment for glass storage, loading and cutting, becoming an undisputed industry reference through its continuous R&D investment and commitment to reliability, versatility and performance. Nowadays the company has an intensive and strong presence in Europe and America, and its products are increasingly acclaimed in Africa, Asia and Oceania.

PRODUCT RANGE

- SMART GLASS STORAGE AND LOADING SYSTEMS
- FLOAT GLASS CUTTING SYSTEMS
- LAMINATED GLASS CUTTING SYSTEMS
- CUSTOMIZED PROJECTS
- SOFTWARE SOLUTIONS





100% EUROPEAN MACHINERY

Quality, reliability and service are a must. TUROMAS production is carried out 100% in its Spanish factories, using only top rated European components and following the highest quality controls to ensure reliability and performance over the years.

READY FOR THE FUTURE

A future-proof investment needs machines able to integrate with other equipment, flexible enough to adapt to new requirements and even capable of growing with the company. Automation and the philosophy of Industry 4.0 are leading the glass industry towards a new model to be prepared for.

SMART STORAGE AND LOADING MACHINERY

TUROMAS provides an entire range of intelligent warehouses to achieve more performance, reliability and flexibility. The new range of automatic storage systems SR and LA have re-

volutionized the concept of storage space utilization, while significantly reducing the loading cycle, making it the current market benchmark. As no two factories or two customers are the same.

TUROMAS designs and optimizes smart glass storage and loading systems individually according to available space, current production needs and future projections in order to generate the ideal solution for each particular case.

PIONEERS IN MAGNET DRIVEN CUTTING TABLES

TUROMAS presented the first-ever cutting table with linear drives back in 2000, enabling

to achieve an accuracy of $\pm 0,1\text{mm}$, maximum speeds of 310 m/min and, most importantly, accelerations of up to 19 m/s², which allowed for unprecedented performance. Since then, many of the world's leading glass processing companies have relied on the reference technology and expertise offered by Spanish machinery.

4-TOOL: CUTTING 4 PERFECTION

The exclusive 4-TOOL cutting technology by TUROMAS offers unparalleled cutting quality in any glass from only 0.55mm to 25mm thickness. It uses specific pressure cylinders, lubrication and cutting wheels for each glass thickness, automatically adjusted without the operator intervention.

The result is a perfect and vertical cutting of any thickness, achieving the famous TUROMAS Open Cut and optimizing the company's time and resources.





ZIPPE INDUSTRIEANLAGEN GMBH

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COMPANY DATA

Contacts

Dr. Philipp Zippe - CEO

Percentage of turnover from glass (%)

100

Sales: Domestic (%) / Foreign (%)

Domestic: 20% / International: 80%

Quality certifications

ISO 9001

Number of Employees

approx. 200

Founding Year

1920





COMPANY PROFILE

Our core business is the development and construction of batch and cullet plants. We pride ourselves on being amongst our customers' most reliable partners, with an infrastructure, the expertise and capability to deliver projects of any magnitude.

As one of the few full-service providers in our industry, our spectrum covers all service areas within plant construction – engineering, planning, design, production, automation technology, installation, site management for all disciplines, commissioning, training for personnel, and services for ongoing operations.

Be it flat glass or hollowware, Zippe batch plants ensure that the batch for every glass type is fully automatically fed into the furnace with the exact consistency and homogeneity needed, at the required amount and at the right point in time – 24 hours a day, every day. Our state-of-the-art control technology is a key element for optimal operation of a batch plant.

We design systems to minimize energy and material consumption – even decrease it in existing plants. The longevity of the Zippe systems and machines, as well as their good maintainability and reparability go a long way to ensure sustainability. We can also help with the modernization of plants and plant checks, software updates and system extensions that Zippe offer, help to further reduce wastage of resources.

There are around 40 Zippe automation and control systems specialists hard at work for you. This means we are one of the few companies able to develop and realise complete control systems in house. Our 24-hour support service enables our customers to contact an expert around the clock either by phone or email.

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- FACTORY CULLET RECYCLING
- GLASS RECYCLING
- BATCH CHARGING
- PREHEATING
- AUDITS
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DAILY NEWS

Tuesday, February 14, 2023



Glaston invests in reducing its carbon footprint



sedak relies on green energy



New Designs for Trosifol® and SentryGlas® bird-friendly solutions



AGC glazing gives iconic Tunis landmark a sparkling makeover



NSG Group: Quarter 3 results of Financial Year ending March 2023



Company news
RCN Solutions at Viridian Glass, Australia
13 February 2023



Company news
Guardian gets Bronze level Cradle to Cradle re-certification in Europe
13 February 2023

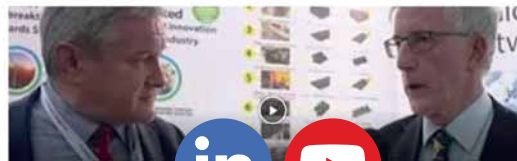


Company news
Glass Futures announces the appointment of two new Board Members
13 February 2023



Customers involve IOCCO in feasibility studies for whole car glass sets

Among IOCCO's contribution in the manufacture of systems for the air extraction during the lamination of windscreens, laminated sidelights and sunroofs is the notable improvement for both concept and fabrication of vacuum bag furnaces....



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Review

February / May

2023

PAGES 104 - 124



February 2023

SAINT-GOBAIN ANNOUNCES RELOCATION OF VETROTECH NORTH AMERICA

Saint-Gobain, through its specialist fire-rated glass subsidiary Vetrotech Saint-Gobain North America, announced the upcoming relocation of Vetrotech North America's Headquarters in Auburn, Washington to a new facility in Faribault, Minnesota. The relocation will allow Vetrotech to invest in new manufacturing technology, continuing the company's commitment to its growth in North America.

By locating in Faribault, Vetrotech North America is able to leverage synergies with other local Saint-Gobain



businesses, notably Sage Electrochromics, the makers of SageGlass. By investing in new technology, the company will

be able to introduce its CONTRAFLAM-ONE fire-rated glass technology to market in the United States, a true eco-innovation combining both performance and sustainability. This move comes as Saint-Gobain continues to implement its global Grow and Impact strategy, which includes expanding its presence in key, fast-growing markets and fostering growth through customer-centric innovation.

"Vetrotech North America's relocation to Faribault, Minnesota will provide us the tools and synergies we need as we continue our commitment to growing our presence in North America and serving our customers," said Kevin Norcross, General Manager of Vetrotech Saint-Gobain North America in Washington. "We thank the Auburn community for their years of hospitality to our business and look forward to engaging with new neighbours in Faribault and building successful partnerships."

The completion of relocation activities for both glass processing and framing system manufacturing was targeted for the end of 2023.

AGC INTERVIEWS JULIANE WOLF OF STUDIO GANG

The St Regis Chicago is the third tallest building in the Chicago skyline with its three interconnected towers and houses residential units, a five star hotel and restaurants. The glass façade of the St Regis Chicago works in tandem with its unique form of nested, undulating stems to reinforce the tower's flowing appearance while

also tuning environmental performance in response to differing floor-to-glazing ratios. Levels with smaller floor plates have darker, higher-performing glass on their facades to control solar heat gain. Reciprocally, levels with larger floor plates are paired with clearer glass.



The façade's design is driven by the building's relationship to its broader urban and ecological context. At a macro-level, the building is lifted to create a pedestrian passageway from the Lakeshore East community to the newly-revitalized Chicago River. When viewed from afar, the tower appears to undulate, which is achieved by straight panels of glass which step in or out by only 5 inches per level, a move that helps to reflect the tones of the sky without using a highly reflective glass.

Studio Gang's design team and project ownership travelled to Germany to work closely with the AGC team to identify and select the glass. They spent time together digitally modelling, creating construction mock-ups and testing batches in the factory, ultimately resulting in the six different types of glass that met their needs for the project.

The St Regis was named one of the best new buildings of 2021 by the Council on Tall Buildings and Urban Habitats and called "easily the most important addition to the Chicago skyline in a generation" by the Wall Street Journal. Chicagoans have reacted positively to the way the glass appears to subtly ripple, picking up the hues of the nearby Lake Michigan and the ambient textures of surrounding buildings.

"We are very happy with the Coating on Demand service provided by AGC," said Studio Gang design principal and partner JulianeWolf. "Seeing it full scale in its final form is very rewarding. As we had hoped, the gradient accentuates the building's flowing form and is a major part of the design. Delivery of the glass went smoothly in spite of global construction and supply chain challenges. One aspect of the glass that has been particularly successful to inhabitants is that the tint reads much more subtly from the interior, so their views appear nearly clear. This directionality of the glass is another aspect that is contributing to the success of the application."

VITRO WINS DESIGN AWARD FOR DUQUESNE SPORTS COMPLEX RENOVATION

Vitro Architectural Glass announced that the UPMC Cooper Fieldhouse in Pittsburgh, Pennsylvania, which features Solarban® R67 (formerly Solarban® 67) Starphire® glass from Vitro, was given a 2022 Design Award from

USGlass Magazine. Formerly known as the A.J. Palumbo Center, the UPMC Cooper Fieldhouse is the home of the men's and women's basketball and volleyball



teams at Duquesne University. In addition to the primary arena, the building also houses the Folino Sports Performance Center, which features nearly 10,000 square feet of athletic training equipment, performance labs and a nutritional centre for the university's student-athletes. As part of a dynamic renovation, developers selected Solarban® R67 Starphire® glass to create a stunning curved façade that brings new life—and more light—to the facility.

“From large-scale installations to unique and artistic uses of glass, the winners of the fourth annual USGlass Magazine Design Awards capture many of today's architectural trends and developments,” wrote the magazine in its coverage of 2022's winners.

The UPMC Cooper Fieldhouse at Duquesne University won the Façade Renovation/Retrofit category in the 2022 Design Awards.

DRS Architects Inc. designed a bright, inviting street-facing façade that provides optimal daylighting for the inside of the facility and also aligns aesthetically with Duquesne University's recent campus upgrades along Pittsburgh's Forbes Avenue. Fabricator Trulite Glass & Aluminum Solutions and glazing contractor Gurtner & Sons Glazing produced the Solarban® R67 Starphire® glass that makes up the building's façade and the Gilliland Pavilion, which offers impressive views of downtown Pittsburgh.

With a solar heat gain coefficient (SHGC) of 0.30 in a standard one-inch insulating glass unit (IGU), Solarban® R67 Starphire® glass offers exceptional solar control performance that improves the overall energy efficiency of the building. Its visible light transmittance of 57 percent indicates that Solarban® R67 Starphire® glass delivers abundant daylight to the building's interior, especially along the northern façade leading to the Clearway Community Energy Gate.

AGC AND SAINT-GOBAIN PARTNER FOR DECARBONIZATION

AGC and Saint-Gobain, worldwide flat glass manufacturers leading in sustainability, announced that they began collaborating on the design of a pilot breakthrough flat glass line that is expected to very significantly reduce its direct CO₂ emissions.

As part of this R&D project, AGC's patterned glass production line in Brevka, Czech Republic, will be entirely refurbished into a high performing & state-of-the-art line that targets to be 50 percent electrified and 50 per-

From left to right: François Lerbet, Guillaume Gasnier, Florence Quintard, Joana Arreguy, Benoît d'Iribarne, Davide Cappellino and Marc Foguene



cent fired by a combination of oxygen and gas. This is a technical breakthrough compared to current technology used in flat glass furnaces fired by natural gas. It will be the most sustainable flat glass line design contributing to both companies' paths towards carbon neutrality and to the necessary acceleration of the flat glass industry decarbonization.

This development will pave the way to the conversion of industrial flat glass lines in such a way that it can be powered mainly by low carbon electricity, more efficient than any gas solution, with significantly reduced carbon emissions for the customers' benefit. The new technology is expected to be implemented on the patterned glass line for operational success by the second half of 2024.

Davide Cappellino, President Architectural Glass Europe & Americas of AGC, said, “To contribute to a sustainable world, AGC is committed to developing products that promote sustainable development, and to reducing the environmental impact of its production processes. Following our continued progress in decarbonization, AGC launched its first low-carbon glass product range at the end of 2022. Now



AGC Brevka plant in the Czech Republic

this hybrid design melter is another important milestone in our Net Zero Trajectory to become carbon neutral as a company by 2050.

The breakthrough design will be done

jointly with Saint-Gobain, combining the best technology knowledge of both companies.”

Joana Arreguy, Industrial Director Glass at Saint-Gobain, said, “We at Saint-Gobain believe strongly in innovation through collaboration. That's why we are delighted to co-develop with AGC a new most advanced technology for flat glass production in the world. This project is in line with Saint-Gobain's commitment to reach carbon neutrality by 2050. This reduction in direct CO₂ emissions will benefit our customers who look more and more for low carbon products to be integrated in their solutions. It also comes a few months after Saint-Gobain made two world firsts: a zero carbon production of flat glass last May and the recent launch of ORAÉ®, the world's first low carbon glass.”



GUARDIAN GETS BRONZE LEVEL CRADLE TO CRADLE RE-CERTIFICATION IN EUROPE

Guardian Glass announced that they attained Bronze level Cradle to Cradle re-certification for float, coated and laminated glass product ranges – manufactured at their European plants.

The initial Cradle to Cradle (C2C) Bronze level Certification version 3.1 for the three European product ranges was



attained in December 2019. Not only are these products now re-certified overall to C2C Bronze level version 3.1, but Guardian Glass is also one of the first float glass companies to meet some of the more stringent requirements of C2C Bronze level version 4.0. The three product ranges achieved at least a C2C Bronze level version 4.0 in three out of five performance categories (Material Health, Product Circularity and Water & Soil Stewardship). For Guardian float glass manufactured in Europe, C2C Gold level version 4.0 was achieved in the Material Health category.

Cradle to Cradle Certified is a global standard for products that are considered safe, circular and responsibly made. For more than a decade, Cradle to Cradle Certified has been helping companies to innovate and optimize materials and products according to advanced science-based measures. The standard encourages continuous improvement over time by awarding certification on the basis of ascending levels of achievement. Each certification level (Basic, Bronze, Silver, Gold and Platinum) represents increasingly rigorous achievement across five categories of performance:

- Material Health
- Product Circularity
- Renewable Energy & Carbon Management
- Social Fairness
- Water & Soil Stewardship

The Cradle to Cradle Building Charter encourages architects and designers to create, from the very beginning of the project, environmentally responsible buildings and have a positive impact on the communities where they are built. A growing number of brands, organizations and building sustainability standards such as LEED, BREEAM and WELL recognize the Cradle to Cradle Certified Product Standard as a preferred product designation for making more responsible purchasing decisions.

Jonathan Brunette, ESG & Certification Manager at Guardian Industries, said, “This is a great achievement by Guardian Glass teams. We are particularly pleased to attain Bronze level version 4.0 in three performance cate-

gories for our European float, coated and laminated glass products. Compared to version 3.1, version 4.0 features new enhanced requirements, including new frameworks for Product Circularity, expanded requirements in Water and Soil Stewardship and improved alignment of Material Health requirements with leading chemical regulations and other standards. The re-certification demonstrates Guardian Glass’ commitment and investment in continuous improvement of its processes, producing more sustainable glass products for the European market.”

AGC GLAZING GIVES ICONIC TUNIS LANDMARK A SPARKLING MAKEOVER

Thirty years after it was built, ETRATON has been reinvented, preserving some of its old distinctive features and breathing new life into its role as an urban landmark located on one of the Tunisian capital’s main thoroughfares. The ground floor is home to a double-height car showroom and showcases the sculptural aesthetics of the old staircase. The remaining floors are all dedicated to office space. The building’s noteworthy corner entrance is reminiscent of a stage curtain being lifted at the edge, as if promising a sneak peek at a remarkable spectacle formed by the play of light and the cityscape. While appearing simple and monolithic at first glance, ETRATON’s skin is truly a glazed veil delivering excellent solar and thermal performance while conferring a singular dynamism on the structure



as a whole. The glass panels were chosen following an exhaustive research process that focused on technical specifications, efficiency and aesthetics with a view to delivering a neutral, untinted and highly reflective result. Two types of prismatic structures punctuate the façade at different heights. This subtle variation in volumes, combined with the characteristics of the glass products used, generates a playful surface of dancing reflections and shadows, and highlights the building’s marvellous sensitivity to daylight and to the colour palette of the surrounding area.

The two AGC glazing products used in this project were Stopsol Supersilver Clear (for its highly reflective appearance) and Energy 65/41 (for its excellent solar and thermal performance).

ETRATON is very much a building of its time, one whose glazed skin demarcates two spectacles – one within, the other without – that are both profoundly symbolic of the life, rhythm and evolution of the city.

SEDAK RELIES ON GREEN ENERGY



sedak has extended the photovoltaic installation on the roof of its production halls. The annual yield is now around 1.7 million kWh

It is not only since the energy price explosion that sedak has been using regenerative energy. The specialists for oversized glass have set themselves a number of targets for 2023 in order to take steps towards even more environmentally friendly production. In 2022 the company already enlarged its existing PV installation on the roof of the main factory.

“With the extension of our PV system we are now able to cover around 80 percent of our electricity requirement using regenerative energy,” said Kevin Berni, Head of Sales and Marketing, pleased about more electricity from the sun.

With its recycling quota of more than 90 percent, glass is a particularly resource-saving building material. But the energy balance of its manufacture leaves a lot of room for improvement as it is energy intensive. Already since 2021, the photovoltaic system has been supplying the company’s location in Gersthofen, Germany, with almost 260,000 kWh annually. The new installation will provide an additional 1,400,000 kWh per year of solar power.

“In total there are more than 4,000 modules with an area of 8,010 square metres,” said Berni. In addition to the PV extension, sedak supports a range of measures from free use of bicycles for employees to economical energy management in the offices and consistent recycling: up to 94 percent of the total waste materials are sorted and recycled. Around 95 percent of the waste from PVB and SG interlayers, for example, goes back to the supplier.



With company bicycles, sedak contributes to reducing CO₂ emissions in factory traffic



VITRO: UNIVERSITY OF ARIZONA’S NEW GLASS-COVERED BUILDING

With its distinct strips of terracotta panels and expansive glazed curtainwall, the new 230,000-square-foot Health Sciences Innovation Building (HSIB) at the University of Arizona features an expansive ground floor forum, daylit student lounges and study spaces, state-of-the-art simulation laboratories and more.

Consolidating the University’s medicine, nursing, pharmacy and public health departments into one building, the only glass capable of meeting CO Architects’ performance, cost, availability and aesthetic goals was Vitro Architectural Glass’ Solarban® 90 Starphire® glass.

“Solarban® 90 Starphire® glass was ultimately chosen for its high-performance, neutral cool colouration and relatively low reflectivity as well as the flatness of the glass,” explained Arnold Swanborn, AIA, LEED® AP, design principal, CO Architects, Los Angeles.

Solarban® 90 glass conveys an appearance like clear glass in both color and reflectance, whether viewed from either the interior or exterior of a building. Since Solarban® 90 glass doesn’t display a noticeably reflected color, it has the versatility to be paired with Starphire Ultra-Clear® glass by Vitro to provide enhanced levels of aesthetics and performance. When paired with ordinary clear glass in a one-inch insulating glass unit (IGU) Solarban® 90 glass provides visible light transmittance (VLT) of 51 percent and a solar heat gain coefficient (SHGC) of 0.23. When paired in a one-inch IGU with Starphire Ultra-Clear® glass, it provides VLT of 54 percent.

Carefully considering the surrounding desert and urban context along with the intense Arizona heat, each building elevation has its own carefully calibrated design. For the east elevation, the architects created the building’s signature terracotta design for shading and to blend in with the Sonoran Desert surroundings. Taking its cue from the local saguaro cactus and its ability to self-shade, CO Architects designed twisted, vertical terracotta panels in an adobe dark red. The panels are attached to a Solarban® 90 Starphire® glass curtain-wall. In between the panels and curtain-wall are a couple of porch areas with outdoor patio space for students.

“The cool tones and reflectivity of the Solarban® 90 Starphire® glass and terracotta complement each other and create a deeply rich patterned façade that is both high performing and salient,” stated Swanborn.

For both the north and south exposures, the façade is curtain-wall. Individually tuning both elevations to minimize heat gain and glare, the south side is fritted and incorporates sunshade and the north curtain-wall contains fins.

In response to the harsh sun on the west side, glass is minimized. The design is comprised of a series of narrow



and deep canyons to limit the amount of time the sun is directly hitting the glass. The windows are no more than 7 to 8 inches wide, with an approximate 2:3 width-to-depth ratio.

A major feature at the HSIB is a large, column-free amphitheatre-style space where students gather for events, presentations, individual and/or group study. "The Forum is conceived as the living room to the building," added Swanborn. "It's a place where students from the four health sciences colleges can mingle, connect, study, eat and share in this town square of sorts."

Because natural lighting and visual connection was very important for this



space, a recessed glass design provides this while creating shade and eliminating the direct sun exposure to the glass. The recessed design enabled the architects to go without low-e glass for this portion of the building and only specify Starphire Ultra-Clear® glass. This greatly increased VLT while significantly lowering reflectivity.

Starphire Ultra-Clear® glass by Vitro provides an unprecedented option for curtain-wall glass applications, offering brilliant clarity and true-to-life views of the outdoors that conventional clear glass simply can't match. A 1/8-inch thick lite of Starphire Ultra-Clear® glass provides a remarkable VLT of 91 percent to infuse interiors with pure, vibrant daylight.

The glass is set on steel horizontal ledges, with no verticals, to maximize the site lines while working with standard glass sizes. On the forum's north side, the glass opens by way of large hydraulic Starphire® glass garage doors that allow the interior to extend into an exterior shaded patio.

A large, open staircase offers daylighting and views, encouraging students and staff to take the stairs all the way up to the ninth floor. Floor three through six house classrooms and student support spaces. The seventh floor holds the Arizona Simulation Technology & Education Center with a black-box theatre and simulation deck providing an immersive simulation environment.

On the eighth floor, 30 exam rooms support inter-professional education and clinical skills practice. The office space on the top floor incorporates a slanted roof and clerestory windows glazed with Solarban® 90 Starphire® glass.

"Glass-fronted offices are carefully arranged parallel to the light monitor and separated by open work areas to ensure each occupant and office space has a sense of time and benefits from indirect daylight and view," said Swanborn.

March 2023

DOW IS AMONG TOP 100 GLOBAL INNOVATORS™ FOR 12TH CONSECUTIVE YEAR

Dow was named as one of the Top 100 Global Innovators for the twelfth consecutive year by Clarivate™, a global leader in connecting people and organizations to intelligence they can trust to transform their world.

Through this list, Clarivate identifies organizations at the pinnacle of the global innovation landscape by measuring excellence focused on exceptional consistency and scale in innovativeness. Dow has been recognized every year under the Chemicals and Materials category since Clarivate began presenting the award in 2011.

Dow's scientists and engineers use cutting-edge technology to develop sustainable, market-driven scientific and technical innovations to deliver solutions to some of the world's toughest challenges. Innovation at Dow helps solve challenges related to affordable and efficient supply of food, suitable housing and high-performing buildings, improved

personal health and comfort, and advancements in emerging technologies such as electric vehicles and smart devices. Dow's collaboration with



customers and investment in high-throughput research capabilities has continued to improve R&D productivity and has accelerated product, process and application development.

"Dow being listed for the twelfth consecutive year signifies the consistent talent and strength of our organization," said A.N. Sreeram, senior vice president, Research & Development, and chief technology officer for Dow. "The capabilities and expertise of Dow's R&D organization provide a distinct competitive advantage, enabling the company to efficiently develop innovative products that are simultaneously better performing and more sustainable."

Gordon Samson, Chief Product Officer, Clarivate, said, "At Clarivate, we aim to bring clarity to the complex. Our focus is to pore over what humanity knows today and to put forward the insight that explores all possible horizons; that enables transition and transformation. We acknowledge the Top 100 Global Innovators 2023 – companies and organizations that know that innovative ideas and solutions to current challenges not only bring rewards to their businesses but foster genuine improvements in society."

GUARDIAN GLASS HONOURS CUSTOMERS WITH PROJECT AWARDS

Guardian Glass North America honoured the glaziers and fabricators of seven commercial projects at its 6th annual Commercial Project Awards event March 6 in Las Vegas. More than 40 recently completed projects were nominated.



“Guardian Glass glazier and fabricator partners have delivered an amazing variety of commercial projects featuring Guardian SunGuard® high-performance glazing over the years,” said Rick Zoulek, Executive Vice President, Guardian Glass. “It’s our pleasure to highlight their hard work, which is critical in bringing the architect’s glass vision to reality. We’re grateful to partner with glaziers and fabricators on all the projects we’ve worked on in the last year, and to put the spotlight on this year’s Commercial Project Award winners. We’re excited about and committed to the collaboration that will deliver the next round of innovative, new projects.”

The nominees were grouped based on location, and the six winners were selected by judges who represent the glass industry as leaders of trade publications, conferences and associations:

- Katy Devlin, Content Director, Editor in Chief, National Glass Association
- Patrick Flannery, Editor, Annex Business Media’s Light Construction Group (Glass Canada, Fenestration Review and Canadian Rental Service); Producer, Top Glass Conference and Glass Talk Podcast
- Andrew Haring, Vice President of Business Development, National Glass Association
- Ellen Rogers, Editorial/Content Director, USGlass and Architects’ Guide to Glass & Metal

Guardian Glass thanks the judges for again lending their expertise to the awards process and for their tireless work as advocates for the glass industry.

VITRO ARCHITECTURAL GLASS CHAMPIONS LANDMARK PITTSBURGH GLASS CENTER

Pittsburgh Glass Center’s expansion will feature Solarban® 72 Starphire® glass, VacuMax™ Vacuum Insulating Glass (VIG) and heavy Starphire® glass by Vitro Architectural Glass. Construction is expected to conclude by summer 2024.

As a longstanding partner of Pittsburgh Glass Center (PGC) – a nonprofit, public-access glass education centre and studio in Pittsburgh’s East End – Vitro Architectural Glass donated glass for both the interior and exterior for PGC’s landmark expansion,



which was set to begin on March 23, 2023. To provide supreme aesthetics, clarity, solar control and insulating performance for the renovation, Vitro’s donation included Solarban® 72 Starphire® glass, VacuMax™ Vacuum Insulating Glass (VIG) and heavy Starphire® glass. This marks the first Pittsburgh-area project to include VacuMax™ Vacuum Insulating Glass (VIG). Additional partners on this project include glass fabricator United Plate Glass, and glazier Southwest Aluminum & Glass Co., Inc., both located in Western Pennsylvania.

“Vitro is thrilled to champion this historic renovation of Pittsburgh Glass Center, which has established itself as one of the premier glass facilities in the United States,” said Ricardo Maiz, president, Vitro Architectural Glass. “The glass used ensures that everyone who visits PGC will enjoy exploring the beautiful new space in complete comfort. We’re honoured to be part of this expansion project, one that will allow PGC to enhance its existing programs and create new programs that will have a monumental impact in our community, the Pittsburgh area and entire region.”

The Solarban® 72 Starphire® glass combination provides high visible light transmittance (VLT), exceptional clarity and superior solar control performance. In a standard one-inch insulating glass unit (IGU), Solarban® 72 Starphire® glass delivers VLT of 68 percent and a solar heat gain coefficient (SHGC) of 0.28.

VacuMax™ VIG units consist of two fully tempered lites of glass separated by a non-lead metal seal and a vacuum air space. The units’ slim construction and light weight allow them to be incorporated into virtually any traditional and advanced glazing system to deliver extraordinary R-values and exceptional insulating performance. VIG units can be used alone as a replacement for monolithic glass or as a substitute for the interior lite in a traditional one-inch IGU where it forms a second airspace and creates a hybrid IGU that can achieve an R-value of R16. VacuMax™ VIG units also deliver increased acoustic performance for dramatic noise reduction and eliminate condensation.

PGC also incorporated a small amount of heavy Starphire® glass in its interior renovations. Heavy Starphire® glass provides 16 percent higher VLT than ordinary clear glass in a 1 3/8-inch laminated glass construction. The



result is superior clarity that securely conceals the actual thickness of the glass. Headquartered in Pittsburgh's Friendship Neighborhood, Pittsburgh Glass Center cultivates an inclusive and welcoming environment that encourages everyone, from the casually curious to the master artist, to learn, create and be inspired by glass. PGC first opened its doors in 2001 and has grown significantly over the past two decades, establishing itself as a go-to destination. The expansion will nearly double its existing space, which will allow PGC to increase its visitors and grow its student base.

MAKING GLASS CLEARER THAN EVER AT GUARDIAN - CLARITY™ NEUTRAL

Developed to meet the growing desire for higher transparency, neutral-looking glass, Guardian Glass' Clarity™ Neutral is a new advanced anti-reflective coated glass for a wide range of commercial applications.



Liam Williamson, Product Commercialization Manager Europe, and Dr. Jens-Peter Müller, Project Leader Vacuum Coatings at Guardian Glass, explained the aesthetic and performance improvements provided by this new generation of products, as well as the development challenges that were overcome.

Guardian Glass has introduced a new anti-reflective glass. Is this a new product?

[LW] Yes, it's a new generation of advanced anti-reflective coated glass called Guardian Clarity™ Neutral. The product offers improved aesthetics and performance compared to the old Clarity product. In fact, it provides the highest transparency of any Guardian Glass product to date. In the visible range the light transmission of the new product is now well above 98 percent, which was not the case for the old product. In addition, having a higher colour rendering index now, for the end customer, this means truer, more natural views through the glass. The product was launched onto the market in October 2022, and we are currently receiving orders and ramping up production.

Where is Guardian Clarity™ Neutral performing better compared to the old Clarity?

[JPM] This new product has better thermal stability, which means we see less colour shift in remaining reflection of the coated glass due to heat treatment. This allows us to define the product in a much smaller colour box, i.e. with a more precise and consistent appearance. Compared to the old product, the size of this box has been reduced

by around 50 percent, especially for the bluish colour. Clarity™ Neutral is now less blue and more neutral.

Those advantages have been achieved due to the optical design of the layer stack – a special composition that utilises alternating low index and high index dielectrics. Better thermal stability also helps to widen the range of applications that the glass can be used in, for example, when printing colours or enamelling onto the glass, which is an emerging market.

Also, due to the product composition, glass fabricators will see much less residues from abrasive processes on the final product. This means the glass is easier to clean after processing.

Heat treatment of coated glass results in partially non-perfect surface structures, where photons will deviate from optical path in transmission and reflection, called haze. With Guardian



Glass artists collaborate inside Pittsburgh Glass Center's Hot Shop studio

Clarity™ Neutral we reduced the haze level by a factor of 2 to about 0.5 percent only.

Besides higher visible transmission we have also higher solar transmission, which results in 2 percent higher solar factor for low-e applications. With around 15 percent less transmission in the ultraviolet range on float glass, Guardian Clarity™ Neutral ensures less product damage due to ultraviolet rays in retail store-front applications. As Liam mentioned, in terms of true colour, this has improved too. Guardian Clarity™ Neutral has a higher colour rendering index with 99 percent now; true colour means here 100 percent, so we are very close to perfection.

In order to "promote" Guardian Clarity™ Neutral a bit more, we also implemented new PVB for laminated glass, which provides more neutral and especially less yellowish transmission. I am sure our customers will like it.

We also tried to make fabrication a little easier, by providing the new product with only one temporary protective plastic film.

Which applications and markets are Guardian Clarity™ Neutral targeting?

[LW] As with our old Clarity product offering, Guardian Clarity™ Neutral is designed with multiple applications in mind. We are targeting a wide range of commercial projects such as retail store-fronts, building façades, curtain walls, decorative glass, balustrades and viewing areas, sports stadiums, as well as special purpose applications such as museum showcases, digital signage and picture frames. Clarity is a globally known and available product with project references across the world.

What were the main challenges to overcome in the development of the new product?

[JPM] In order to achieve a more precise product with a smaller colour box, we needed to design a quite advanced layer stack. This does mean the product is more complex or challenging to tune in at the coaters than the old product.

Last but not least we developed this new product during the COVID-19 pandemic. With no travel allowed, developing a new high-performance product such as this brought many challenges. However, the marketing and development teams in the USA and Europe worked remotely but closely together to develop Guardian Clarity™ Neutral. The collective teamwork across the world between local production teams, application engineers, as well as European and global development teams, were critical to the whole process.

The expansion also includes renovating a second building two blocks away from the existing facility to create additional housing for technical apprentices and visiting artists and add a gallery space for emerging artists and community programming. Pittsburgh Glass Center will host a ground-breaking ceremony on March 23, 2023, to kick off the project.

THE EUROPEAN PARLIAMENT ADOPTS ITS POSITION ON THE EPBD

The European Parliament adopted its position on the Energy Performance of Buildings Directive (EPBD) with 343



votes in favour, 216 against and 78 abstentions. "Huge step forward for lower energy bills, reducing energy poverty, and tackling 36 percent of EU emissions," tweeted C. Cuffe, MEP rapporteur on the EPBD.

Glass for Europe welcomes the adopted text which strikes a balance between the different visions of the European Parliament, allows flexibility to Member States and provides the industry the predictability and market stability needed to deliver on the Renovation Wave.

Saving energy and imported gas in Europe's building stock is an imperative largely recognised yet transforming the building stock takes time and efforts over the long term. Today's vote provides the much-needed impetus to pursue and accelerate building renovation efforts.

In the months to come, co-negotiators must build a constructive dialogue to make sure that the EPBD delivers on its purposes. The European flat glass industry is ready to deliver on the ground by manufacturing the high-

performance glazing needed to improve comfort, reduce energy for heating and cooling and contribute to the decarbonisation of EU buildings. Nearly 36,4 Mtoe could be saved in 2023 by doubling the window replacement rate.

SPECTACULAR DEMONSTRATION OF HEAVYDRIVE TECHNOLOGY

Together with premium glass manufacturer sedak, Heavydrive organised a test run for the installation of a pane measuring 14 metres long and 3.2



metres high with a weight of 1.4 tonnes. The guest at this tricky demonstration was a customer from Salt Lake City, Utah, USA.

The demand for extremely large panes continues to increase – on the American market too. Yet contractors are often unsure how to handle the installation of extremely large glass elements. Planning to use mega panes for his approximately 80 metre high construction project, the customer from Salt Lake City is on the lookout an expert installation partner.

The test run in Gersthofen, Germany, including loading, assembly and dismantling, took a total of six hours. The preparation of the system in an extremely confined space tested the expertise of the employees.



The US customer was inspired by the professional demonstration. During his visit to the Heavydrive headquarters, he adjusted his specification to suit his project.

The Heavydrive staff also ensured the equipment was properly packaged and took care of the customs documents required to transport it overseas.

"NSG GROUP EHS AWARDS 2022" HELD WORLDWIDE

NSG Group has announced that it held the sixth Environmental, Safety and Health Awards (EHS Awards) 2022 as an initiative to encourage and recognize outstanding activities in important areas of sustainability inside the global NSG Group. The following projects were awarded as the winner in each category.

This time, an additional category of Community Projects was added to the existing "Environment" and "Health and Safety" categories to encourage the works the teams carry out with local communities outside of the factory



gates. The winner and four additional commendations in each category were chosen by the judging panel from a total of about 170 project entries in three categories from all regions globally.

Health & Safety Project Award

Automotive Glass Business Original Equipment (OE) North America for their 'Safety Patrol' project



The project team worked together to build from old or existing approaches to behavioural safety, to create a structured approach to Gemba Walks (Safety Patrol). This project is culturally very important and promotes a consistent approach to leaders walking the shop floor, recording discussions, hazards and concerns that were observed.

Environmental Project Award

The San Salvo site in Italy, Architectural Glass Float operations and Automotive OE, for their 'Water Consumption Reduction' project.



This project significantly reduces more than 70 percent of water taken from a local river used for several applications at the site. This has been done by improving the efficiency of water usage in the production processes such as automated valves, increased water recycling and the use of rainwater.

In the past two years the site has saved over 1,980,000 m3 of water, equivalent to 800 Olympic size swimming pools. Water that has not been used by the site is now used by Local Public Consortium to purify it for drinking, helping the community especially during the dry summer months when due to tourism the water consumption in the region is higher than average.

Special Community Award

Automotive Glass Business OE Vizag (India) for their 'Safety Awareness in the Community' project.



This project covers all site activities by providing safety briefings and education to local school children and students, safety communication to the community and families of the employees. The winner stood out because of the impressive commitment to promote safety awareness in the communities through 5 C's: Culture, Collaboration, Communication, Commitment and Contribution.

NSG Group will continue to promote sustainable growth of their business through solutions to environmental, safety and health, and social issues by working on sustainability.

VITRO LAUNCHES VITRO X INNOVATION PARTNERSHIPS PROGRAM

Vitro Architectural Glass has announced the launch of Vitro X™ Innovation Partnerships, a new strategic partnership program focused on



identifying and developing inspired solutions to existing and future challenges in the glass industry. Concurrently, Vitro announced its first partnership through the program with AERAS, an emerging technology company specializing in advanced drone applications.

As an incubator for innovation, the Vitro X™ Innovation Partnerships program enables Vitro to collaborate with future-focused companies as an early investor to support their work and shepherd their ground breaking ideas, including new functionalities and services to building owners and home-owners, from the drawing board to the production line, installation, maintenance and beyond.

Through Vitro X™ Innovation Partnerships, Vitro is teaming up with a select group of growing businesses that are developing revolutionary technologies with the potential to impact the future of the glass industry. Together, Vitro and its partners will bring new products and services to market that will enhance and protect glass surfaces, reduce the need for exterior glass maintenance and even make outdoor venues healthier.

"Vitro X™ Innovation Partnerships allow Vitro to become a hands-on partner with progressive companies that have the power to influence glass in some way, with an innovative, non-traditional approach," said Martin Bracamonte, vice president, marketing & innovation, Vitro Architectural Glass.

The first partnership to be announced through the Vitro X™ Innovation Partnerships program is with AERAS, which operates advanced drones that have the capacity to serve as an alternative to traditional commercial window and glass façade washing to support both building owners/operators and facility managers.

Headquartered in Pittsburgh, Pa., AERAS challenges the standards of drone technology with its revolutionizing research, such as developing the only drone in the world operating with a charged-electrostatic disbursement system. AERAS is also the first company in the United States certified by the Federal Aviation Administration (FAA) to use drones to provide decontamination services against viral contaminants such as COVID-19 at large gathering spaces like outdoor event venues, which

has created a new standard in large-scale sanitization. With additional development support and marketing services offered through its Vitro X™ Innovation Partnership, AERAS' products may also serve as alternatives to traditional commercial window washing and be used for servicing solar energy fields with aerial cleaning technology.

GUARDIAN GLASS: MATMUT FILATURE

Designed for prioritising sustainability, the curvy Matmut Filature is a modern, energy efficient office building facing the headquarters of



of the Matmut insurance headquarters in Rouen, France. The design choices were guided by the owner's desire for Passivhaus certification, which sets very low energy consumption targets. Another example of the building's sustainability priorities: it boasts a 30 centimetre thick vegetated roof.

The project's glass façades consist of triple glazing (some elements of which are curved) with solar control that also regulates the lighting. The skylights, located in the heart of the complex, and the large central atrium distil the natural light in all the floors, ensuring the building is cooled naturally.

Three Guardian Glass products were selected for the building:

Guardian SunGuard® eXtra Selective SNX 60/28, a solar coated glass that provides the ideal balance between high light transmission and low solar factor, with outstanding thermal performance. Natural daylight is maximised whilst reflecting the optimum amount of solar heat away from the glass, helping to keep occupants comfortable at all times.

Guardian SunGuard SuperNeutral™ SN 70/37 was selected for its beautiful, neutral, transparent appearance with low reflection, consistent colour, high solar protection and high light transmission.

Guardian ClimaGuard® Premium coated thermally insulating glass was also selected for its high thermal insulation, neutral appearance and high light transmission.

GLAS TRÖSCH: SPECIALIZED NEEDS FOR BOTH NEUROSCIENCE AND FAÇADE

For the new neuroscience research building of the California Institute of Technology, the architects at Smith-Group developed an integrative design that explicitly promotes learning and interaction.



It included generous windows that direct light from one side of the building to the other.

When selecting building materials, the architects opted for classic Southern Californian elements such as travertine and copper. This made Glas Trösch's OKATECH insulating glass with copper inlay the perfect choice. It also meets high solar and glare protection requirements, contributing to the building's LEED Gold status.

AGC GLASS EUROPE: PYROBEL VISION FIRE-RESISTANT GLAZING

Check out what a AGC Glass Europe's Pyrobel Vision line glazing looks like after being exposed during more than 90 minutes to temperatures exceeding 1000 degrees Celsius.

This fire-resistant edge-to-edge glazing turned into a white wall, acting like a barrier to flames and hot gases for building occupants and protecting them from the heat, so they have a secure route to evacuate safely in case of fire.

The picture was taken after more than 90 minutes of an EI-90 fire-test of Pyrobel Vision Line in a wooden frame with silicone, tested in DMT Lathen Germany. EI-90 indicates that the glass and the frame will act at least during 90 minutes as a barrier to flames and hot gases and block the heat transfer through it.

Pyrobel is probably the most tested and fire-rated glass on the market.





April 2023

SAINT-GOBAIN: FIRST FLAT GLASS PRODUCTION USING MORE THAN 30% HYDROGEN



Saint-Gobain was the first manufacturer in the world to carry out a test production of flat glass using more than 30 percent hydrogen during Research & Development (R&D) trials at the Herzogenrath site in Germany.

With this world first, Saint-Gobain has proven the technical feasibility of manufacturing flat glass with a significant proportion of hydrogen, which will complement other decarbonized energy sources and reduce the site's direct CO₂ emissions (scope 1) by up to 70 percent.

This research strengthened Saint-Gobain's position as a world leader in sustainable construction and confirmed its leading role in helping to build a carbon neutral economy.

The technical feat was made possible by an R&D program launched in 2022, drawing on the Group's extensive expertise in combustion, glass quality, ceramic refractories materials and industrial furnace design. The program in question was carried out in collaboration with the independent German laboratory Gas and Heat Institute Essen e.V. (GWI), a specialist in industrial gas technologies, and financially supported by the Land of North Rhine-Westphalia to the amount of EUR 3.64 million.

These industrial tests in Herzogenrath have been preceded on a laboratory scale by trials carried out in two research centres in France: Saint-Gobain Research Paris in Aubervilliers and Saint-Gobain Research Provence in Cavaillon.

Analysis of the data from these tests will make it possible to deploy the use of hydrogen in the Group's floats in the decades to come, when low-carbon hydrogen is available in sufficient quantities.

The breakthrough innovation marked a new milestone in Saint-Gobain's roadmap towards carbon neutrality in 2050. It complements R&D initiatives on the electrification of glass melting and notable achievements, such as the world's first zero-carbon production of flat glass at Aniche in May 2022, thanks to 100 percent cullet and 100 percent decarbonized energy (biogas).

SAINT-GOBAIN DIVESTS ITS GLASS PROCESSING BUSINESS IN SWITZERLAND

Saint-Gobain signed a binding agreement for the sale of its glass processing business Glassolutions in Switzerland to the privately-owned German group AEQUITA.



Its business generated sales of around EUR 25 million in 2022 and employs approximately 70 people at its production site in Kreuzlingen.

The transaction was expected to close by the end of May 2023 as part of Saint-Gobain's continued business profile optimization strategy, in line with the "Grow & Impact" strategic plan.

ŞİŞECAM EXPANDS ITS EPD CERTIFIED PRODUCT PORTFOLIO

As an environmentally friendly company, Şişecam prioritized energy and resource efficiency across its entire value chain.

Şişecam focused on monitoring the carbon footprint of its products and further boosted its sustainability performance. The company also contributed to sustainability with 11 internationally valid and verified EPD (Environmental Product Declaration) certificates for its entire flat glass product range

– including clear float glass, tinted float glass, ultra clear float glass, extra clear float glass,



online coated glass, offline coated glass, patterned glass, solar glass, mirror, lacquered glass and laminated glass.

Şişecam was the first company in the Turkish glass industry to issue this declaration, having received the Environmental Product Declaration (EPD) certificate for its flat glass group in 2018. Şişecam focused on the life cycle in the value chain with an end-to-end sustainability approach, while also expanding the scope of its efforts to register its sustainable products.

In 2022, Şişecam implemented and published its Environmental Product Declaration (EPD) as part of an initiative with Metsims, one of the industry's leading consulting firms. This effort aimed to register Şişecam's sustainable products and manage sustainability expectations for the company's entire value chain and to provide LCA approach and LCA/EPD literacy training workshop.

Environmental Product Declarations also evaluate production processes and the whole value chain pre- and post-production from an environmental perspective. These

declarations provided the opportunity for producers to ensure resource efficiency, reduce environmental impact, boost brand value, and share environmental performance transparently with decision-makers, such as architects and engineers, as well as end consumers. Environmental Product Declarations – critical especially in terms of green building certification and sustainable material use, much like LEED and BREAM – have been gaining in importance in parallel with growing awareness about sustainability.

PROMAT PYROSEC® SLIMLITE DOORS MAXIMISE FIRE PROTECTION

The PYROSEC® SLIMLITE door system from passive fire protection specialist Promat provides an ideal solution for safe, sustainable and healthy buildings thanks to its ability to sustain assured levels of fire resistance without compromising light transmission.

The innovative system enables specifiers to meet

the brief for doors requiring a fire rating of either EI30 or EI60 (integrity and insulation) without the need to surround the glass with a bulky frame, as is often the case with many glass doors.

Available in a single or double leaf configuration, PYROSEC® SLIMLITE doors are manufactured using all stainless steel 25 millimetre stiles and 90 millimetre rails, which allow the door leaf to sit within a super-slim 20 millimetre frame section. This minimal framing and sleek back to back full height handles maximises the area of glass in features such as internal screens and partitions to perfectly balance the need for fire protection and light transmission.

When PYROSEC® SLIMLITE is combined with the Promat SYSTEMGLAS® Ferro steel frame fire resistant glazing system, butt jointed glass features can be created with only the slimmest of vertical framing visible around the door. The combination provides architects and specifiers with a complete glazing solution backed by third party test evidence and Promat's 360-degree 'Wheel of Assurance.' This provides complete traceability of the installed product in line with the golden thread.

It is ideal for use where the design seeks to allow daylight to pass through the screen or partition to not only help reduce the need for artificial lighting, but also ensure building users stay visually connected in buildings such as offices, hospitals and schools.

An additional option is also available for fire resistant glass doors where the glazing feature height or width is such that an over-panel or side-light is required. This comes in



the form of the Promat PYROSEC® Door, which offers similarly appealing aesthetics and fire performance capability, but with the key difference of featuring a slightly wider 50 millimetre frame section to provide additional structural strength.

TURKISHGLASS IS EXPANDING ITS PRESENCE IN THE US MARKET

TurkishGlass, the association representing the glass manufacturers, glass processors and glass exporters of Turkey, took part in the Façades



Plus Conference in New York on March 30 and 31, 2023, where developers, architects, façade engineers, contractors, building specifiers and manufacturers from all over the world came together.

At the TurkishGlass booth, participants were informed about how the Turkish Glass sector is adding value to projects with advanced glass solutions, and contributing to the future of our planet with sustainable products and technologies. In addition the most sophisticated and demanding global projects completed by TurkishGlass were shared with visitors.

TurkishGlass, the solution partner from the beginning to the end of the most demanding projects, is looking forward to meeting you at this year's façade events.

VITRO ARCHITECTURAL GLASS SUPPORTS PITTSBURGH GLASS CENTER

As one of the champions of Pittsburgh Glass Center (PGC)'s landmark expansion, Vitro Architectural Glass donated glass for both the interior and exterior renovations, which helped enhance the design, functionality and sustainability of the project. As a long-standing partner and supporter of PGC, Vitro representatives were thrilled to attend the ground-breaking ceremony and hot pour event on March 23, 2023.



Vitro representatives gathered following the hot pour demonstration. Photo: Scott Witalis

Produced entirely in Pennsylvania, Vitro's donation included Solarban® 72 Starphire® glass for exceptional light transmission and solar control performance. Additionally, this was the first Pittsburgh-area project to



Vitro President, Ricardo Maiz -
Photography/Video: Scott Witalis

include one of Vitro's newest products, VacuMax™ Vacuum Insulating Glass (VIG), for world-leading insulating value on a scale previously unachievable with conventional glazings. Additional partners on this project

include glass fabricator, United Plate Glass, and glazier, Southwest Aluminum & Glass Co., Inc., both located in Western Pennsylvania.

Through its forward-thinking and progressive strategies and approaches and its commitment to its people, plants and communities, Vitro reinvigorated the glass industry in Western Pennsylvania and across North America. This historic renovation project marked yet another milestone in the long history of glass in Pennsylvania and, once completed, will have a significant impact on the Pittsburgh community and surrounding region.

"Vitro is proud to have earned its reputation as an environmentally progressive glassmaker and a leader in sustainability in the building products sector," said Ricardo Maiz, President, Vitro. "Our research and development center in Pittsburgh is the leading driver of innovation at Vitro, and, of the 300-plus patents to the credit of that research lab, most are related to reducing the environmental impact of buildings and producing glass more sustainably."

Maiz added, "We continue to re-imagine the future of architectural glass and we're very pleased to be doing so right here in western Pennsylvania. Our vision is to raise the industry standard and provide architects and building owners high-performing, sustainable and attractive glass technologies for the buildings of tomorrow."

EUROGLAS NOW USING ENVIRONMENTALLY FRIENDLY SEPARATING AGENT

As part of the sustainability initiative "Green for Generations," the Glas Trösch Group has been working constantly on becoming even more efficient and environmentally friendly in all areas. Here, it is often the seemingly little things that have the greatest impact.

A prime example of this can be seen at Euroglas, a company part of the Swiss Glas Trösch Group, which has switched to a more sustainable alternative for its glass separating agent and has thus taken on a pioneering role in the glass industry.

In order to prevent panes of glass from sticking together, powder is applied to all float glass immediately after the



cooling process. However, not all separating agents are the same. The products used in the industry up to now usually contain small quantities of microplastics. With this in mind, Euroglas set out to find a more environmentally friendly alternative.

Following intensive discussions with the manufacturer and a test phase lasting several months, a new separating agent was found that is completely free from microplastics. As a result, Euroglas is already meeting the planned EU regulation on limiting microplastic use

PILKINGTON TO INVEST OVER USD 86 MILLION IN LAURINBURG PLANT

Pilkington North America, part of the NSG Group, will invest USD



PILKINGTON

86.8 million in its operations in Laurinburg, Scotland County, North Carolina, USA. The project includes the rebuild of one of its two float glass lines, expansion of existing coating capabilities and other building and equipment improvements at the company's float glass facility that will create 20 jobs in Laurinburg.

"Global manufacturers like PNA choose North Carolina time and time again," said Roy Cooper, North Carolina Governor. "This decision proves that our state's investments in workforce development and infrastructure continue to pay off, bringing us new jobs and investments."

"This year our Laurinburg plant will celebrate its 50th anniversary," said Stephen Weidner, Head of Architectural Glass North America and Solar. "This investment shows our ongoing commitment to our customers and the community. We appreciate the support received from the State on this project."

"North Carolina's track record for attracting foreign investment means our state is one of the best places to do business in the world," said Commerce Secretary Mabelle Baker Sanders. "To keep our winning edge in the global market, I will continue to build relationships with international partners and make sure our state continues to support the things that make a difference, like training our workforce for the opportunities that lie ahead."

SCHOTT: MULTIMILLION-DOLLAR CONTRACT TO SUPPLY INFRARED GLASS TO U.S. ARMY

SCHOTT North America has been awarded a multimillion-dollar contract from a leading defence contractor for infrared glass. The order supplies glass for launch tube windows, a critical component of air defence systems provided to the U.S. Army. The contract was secured through the advocacy of Representative Matt

Cartwright, from Pennsylvania's eighth congressional district, who has long supported a robust defence budget. SCHOTT's Duryea, Pennsylvania facility will manufacture the specialty glass, as it does for other products that support the U.S. Department of Defense.



U.S. Representative Matt Cartwright (PA-08) inspecting a launch tube window for the U.S. Army Air Defense System with SCHOTT Project Engineer Elizabeth Chase - Credit: SCHOTT

SCHOTT is already producing launch tube window parts for an existing order and will now be able to extend production and further support employment at its site in Duryea. The company has been working with U.S. Department of Defense (DoD) programs since 1969 as a leading developer of high-tech materials and components and is eager to continue its support of the department. The security and defence industry requires high-performance base materials and optical components to enable reliable and precise defence systems.

"Our expertise in creating specialty glass suitable for defence applications has earned the trust of the U.S. Army and the DoD, and we're appreciative of the chance to show why they keep turning to us," said Christopher Cassidy, President of SCHOTT North America. "This contract not only supports our production site of over 150 employees in Duryea, but also strengthens our commitment to supply the U.S. defence and security market. We especially want to thank Congressman Cartwright for his continued support of SCHOTT and the entire North-eastern Pennsylvania community."

"America's security and defence require the best materials available, and we're able to build them right here in Pennsylvania's 8th Congressional District," said Cartwright (PA-08), a senior member of the powerful House Appropriations Committee and Ranking Member of the Commerce, Justice and Science Subcommittee. "SCHOTT has proven its mettle with a history of innovation, and its expertise allowed us to bring federal funding back to this district."

Cartwright visited SCHOTT's Duryea facility April 12 and highlighted the importance of this contract and its impact on the local community.

SCHOTT's U.S. Innovation and Technology Hub, also located in Duryea, continues to be a leader in the research and development of high-tech materials. Its participation in basic materials research has helped create the supply of dual-use products for both civilian and military applications. The company's glass-ceramic ZERODUR® has been used in space telescopes since 1968, and SCHOTT has supported NASA's lunar missions with optical lenses for cameras since the early 1960s.

ŞİŞECAM GETS 'DISTINCTION' AWARD AT THE INTERNATIONAL SAFETY AWARDS

Şişecam, a global player in the glass and chemicals industries, operating in 14 countries with more than 24,000 employees, continued to be recognized for its exemplary practices that put people first. Şişecam received the 'Distinction' award at the International Safety Awards 2023, organized by the British Safety Council, a leading authority in its field. Some 978 organizations from 44 countries participated in this year's competition.

Following an evaluation by independent jury members of the British Safety Council, Şişecam was presented with the 'Distinction' award, the top category designation, for its 2022 approach to preventing workplace injuries and work-related diseases, and its workplace well-being practices.



British Safety Council Chief Executive Officer Mike Robinson stated, "The British Safety Council applauds Sisecam on their achievement. The award is in recognition of their commitment and hard work to keep their employees and workplaces free of injury and ill health."

Celebrating its 65th anniversary, the International Safety Awards recognizes exceptional companies and efforts around the world that strive to prevent workplace injuries and diseases and achieve effective results.

Şişecam aims to maintain a healthy and safe working environment in all stages of its production activities. Many actions are taken by the company to fulfil its responsibility to foster healthy individuals and a healthy workforce in line with this goal. Şişecam takes all measures necessary to prevent work accidents and occupational diseases and ensures their implementation. Şişecam holds continuous trainings and other activities to develop an occupational health and safety culture, working non-stop to maintain a healthy and safe organization with healthy employees.

AGC GLASS EUROPE PURCHASES GREEN ELECTRICITY FOR BELGIAN PLANTS

Glass producer AGC Glass Europe signed an electricity purchase agreement with Luminus for the supply of 67 GWh of green electricity. This will be helping AGC to make its existing production process in Belgium even more sustainable. The contract extended the long-term cooperation between the two companies. Luminus has already erected a wind turbine at AGC's site in Seneffe, and the two companies also intend to build a wind turbine at AGC's sites in Mol and Zeebrugge.

The recently concluded Corporate Power Purchase



Agreement (CPPA) covers the entire production of fourteen Luminus wind turbines in Ciney and Dinant, and covers the annual supply of ± 67 GWh of wind energy to AGC Glass Europe over the coming years.

This long-term contract will make a significant contribution to AGC Glass Europe's roadmap towards carbon neutrality. By increasing the share of renewable energy in the total energy consumption of its Belgian production facilities, AGC, a world leader in flat glass, has made a further effort to make its production of glass for the building, automotive and other sectors even more sustainable. Thanks to the renewable electricity that will be purchased under the CPPA with Luminus, CO₂ emissions at its Belgian sites will be reduced by approximately 13,000 tonnes per year.



AGC also relies on green electricity produced locally at its production sites. To this end, Luminus has already built a wind turbine at AGC's Seneffe site in 2021. This wind turbine, the first in the world for the glass producer, was also part of AGC Glass Europe's policy to achieve carbon neutrality. It avoids the emission of 1,350 tonnes of CO₂ every year. In addition, Luminus and AGC intend to build a wind turbine on the AGC sites in Mol and in Zeebrugge, which should make it possible to avoid a further 4,000 tonnes of CO₂.

Davide Cappellino, President of AGC Architectural Glass Europe and Americas, said, "We are taking another big step towards climate neutrality. Together with our partner Luminus, we are taking a holistic approach to using as much renewable electricity as possible, as part of AGC's roadmap to low carbon glass production."

Against a backdrop of geopolitical, economic and climate challenges, Luminus is more than ever committed to helping its customers reduce their energy bills and their ecological footprint.

Grégoire Dallemagne, CEO of Luminus, said, "We are seeing a growing demand from energy-intensive companies in our country to cover their electricity consumption with renewable energy sources. By doing so, they reduce their energy bill and their ecological footprint while strengthening their competitiveness. AGC Glass Europe has long understood this. I would therefore like to thank them warmly for their long-standing collaboration and trust. Together we will build a CO₂-neutral energy future."

The fight against climate change: a daily commitment For Luminus, the fight against climate change has been a daily commitment for many years. The company has been investing in the production of renewable energy

for almost 70 years and is the number one in on shore wind power and hydropower in Belgium. With its 270 wind turbines, Luminus has an installed capacity of 698 MW, good for supplying more than 381,6000 households with green electricity.

HISTORIC ART DECO THEATRE RESTORED WITH GLASS BY VITRO ARCHITECTURAL GLASS

The Alberta Bair Theater in Billings, Montana, USA, is the sole performing arts centre in the Northern Rockies region with the capacity to present shows by major touring theatre companies and artists, and its role as a home for the theatre arts is nothing short of essential.

In 2022, this beloved theatre was carefully restored and expanded with accessibility upgrades, preservation efforts and a stunning "glass box" façade featuring Solarban® 70 glass (formerly Solarban® 70XL glass) from Vitro Architectural Glass, which helped earn the project a Metamorphosis Award from retrofit magazine for excellence in renovation.

The Alberta Bair Theater was originally opened in 1931 as the Fox Theater and was partially financed by the 20th Century Fox Corporation.



As such, the 26,800 square foot, 1,390-seat theatre functioned as a venue for both film screenings and regional theatre performances. Designed by architect Robert C. Reamer, the original theatre boasted Art Deco detail throughout the building, such as crystal chandeliers, decorative stage elements and sumptuous dressing rooms. In fact, the Alberta Bair Theater was the last theatre featuring the Art Deco style to be built in the U.S. by 20th Century Fox.

Nearly a century later, architectural firm Cushing Terrell in Billings led the renovation and expansion efforts that restored the theatre to its former glory and ushered in a series of improvements to the original design that have transformed it into a more accessible venue for all.

On the building exterior, the envelope of the building has been pushed outward to provide additional space for ADA access, improved vertical circulation and an expanded lobby and box office area.

A second addition, a 4,800 square foot, two-story, glittering glass box façade, gives the theatre a clear curtain wall system that encourages a better visual connection to the theatre's interior.

Architects at Cushing Terrell selected Solarban® 70 Optigray® glass for this stunning addition, which has

brought new life to the light grey, subtly moody façade of this historic theatre.

With its transparent, colour-neutral aesthetic and unprecedented solar control and visible light transmittance (VLT), Solarban® 70 glass strikes just the right balance between form and function. Due to its clarity, consistency and solar control performance, Solarban® 70 glass has become the most commonly specified triple-silver-coated glass in the entire industry, with more than 300 million square feet shipped in the past 10 years.

When coupled with conventional clear glass in a one inch insulating glass unit (IGU), Solarban® 70 glass outshines the performance of any other solar control low-e glass on the market today, boasting a solar heat gain coefficient (SHGC) of 0.27 and VLT of 64 percent. Additionally, Solarban® 70 glass can be combined in an IGU with any tinted glass from Vitro Architectural Glass.

In this case, Solarban® 70 glass was coupled with Optigray® glass from Vitro to accomplish a specific aesthetic. Optigray® glass is designed to eliminate the green cast typically found in conventional clear glass formulations and produces a warm, ultra-neutral, light-grey aesthetic that brings crispness to vision glazing.

Specially formulated to function as a substrate with solar control low-e coatings, Optigray® glass delivers advanced solar performance when paired with solar control low-e glasses such as Solarban® 70 glass. Optigray® glass produces light-to-solar gain (LSG) ratios of up to 1.96, with VLT between 29 percent and 50 percent, depending on which Solarban® glass is specified.

PILKINGTON UK INVESTS IN SUSTAINABLE GLASSMAKING IN ST HELENS

Pilkington United Kingdom Limited, part of the NSG Group, made a multi-million-pound investment in its Merseyside facilities as part of a government-backed project to save 15,000 tonnes of carbon emissions each year while securing the future of rolled glass manufacturing in the UK.

Under the project, Pilkington UK will move its Watson Street manufacturing operations to its Greengate site in the town. The move represents a major investment in its Greengate glass furnace, which melts the raw materials into glass as part of the manufacturing process.

The Greengate furnace will be upgraded to accommodate its continued production of flat glass, while delivering the additional output required from the relocation of its Watson Street



rolled glass manufacturing line. The project was instigated as the manufacturer's furnace at Watson Street, where the business has operated since 1826, reaches its end of life. The site will be shut-down with all jobs from Watson Street being relocated to Greengate as part of the project.

Producing all glass out of the upgraded furnace, rather than running two, will save carbon emissions equivalent to taking 8,800 cars off the road each year.

The work began in August 2023, with the line due to be up and running by August 2024. Watson Street will remain open until then, with no impact expected on the availability of glass while the work takes place.

The project will benefit from a GBP 3.7 million grant via the government's Industrial Energy Transformation Fund (IEFT), which helps cover the costs of industrial energy efficiency and decarbonisation projects in the UK.

Neil Syder, managing director of Pilkington UK, said, "This project represents one of the single biggest investments we've made in our UK manufacturing facilities in decades, and will ultimately secure the future of rolled glass manufacturing in the UK.

"Working out of one furnace will enable us to make a permanent and significant saving in CO₂ emissions. It's a radical shift in the way we operate, but we know that if we are to achieve our net-zero ambitions, we need to make change across all areas of our business.

"The Watson Street site has been operating since the 1800s and forms a key piece of our history. Throughout the years, the site has been instrumental in the development of different products, paving the way for a rich history of innovation in glass solutions.

"Yet this move marks a new chapter in our story that allows us to embrace more sustainable ways of making glass and continue to drive forward our vision for change, in partnership with the industry."

In 2022, the Science Based Targets initiative (SBTi) certified the NSG Group's aims to reduce greenhouse gas emissions by 30 percent by 2030, compared to 2018 levels. This forms the basis of the business' plan to achieve carbon neutrality by 2050.

VIVO X FOLD 2 AND VIVO X FLIP FEATURE SCHOTT SPECIALTY GLASS

The new flagship models vivo X Fold 2 and vivo X Flip feature cutting-edge specialty glass from SCHOTT - Photo: vivo

vivo's new flagship phones vivo X Flip and vivo X Fold 2 arrived fully packed with glass innovations from SCHOTT, whose founder Otto Schott invented specialty glass. The vivo X Flip was the first foldable phone to be certified by TÜV Rheinland to withstand over 500,000 folds, and this model features SCHOTT UTG®, a flexible glass



that's thinner than a human hair with an outstanding bending strength after processing.

In addition, both models featured external displays that are protected by



SCHOTT's most drop-resistant cover glass Xensation® α (Alpha). The imaging system vivo co-engineered with ZEISS are protected by high-performance Xensation® Up. cover glass tailored for camera modules.

This launch continued the long-term partnership between the leading Chinese smartphone manufacturer and the German sister companies under the Carl Zeiss Foundation - ZEISS and SCHOTT. vivo has been the first smartphone manufacturer to feature SCHOTT's latest high-performance cover glass Xensation® α. vivo's first foldable model, vivo X Fold, also came loaded with SCHOTT specialty glass innovations, including foldable ultra-thin glass from SCHOTT UTG® series and high-performance cover glass from the SCHOTT Xensation® series.

"We are very pleased to be a trusted partner for our customer," says Dr Feng He, Head of Global Product Management and Application of UTG Cover at SCHOTT. "As a pioneer in UTG and cover glass, SCHOTT has a wealth of knowledge gained over the past decades. We are excited to take part in shaping the future of foldable devices."

May 2023

VITRO: AGREEMENT TO MANUFACTURE GLASS FOR AMERICAN-MADE SOLAR PANELS

Vitro S.A.B. de C.V., through its Vitro Architectural Glass business head-quartered in Cheswick, Pennsylvania, USA, announced that it entered into an agreement with America's largest fully vertically integrated solar manufacturer, First Solar, to manufacture glass for the company's advanced thin film photovoltaic (PV) solar panels. Vitro is investing a total of USD 93.6 million to rebuild



and modernize a production line at its Meadville Plant located in Cochran, Pennsylvania, to support First Solar's growing

manufacturing footprint in the United States. The investment includes the construction of offline production capabilities.

"This agreement is a true manifestation of Vitro's purpose of enabling the full potential of glass to shape how we move, build and live today and in the future. It also reflects our continued commitment to the North American Trade Region and is proof that we have a sound strategy for growth as a global player. We are thrilled by how, through this partnership, we will serve the U.S. market with new and better sustainable products while advancing our strategy to drive growth in the renewable energy sector," said Vitro CEO, Adrian Sada.

"While much of the focus has been the role of clean energy manufacturing tax credits in catalyzing solar manufacturing, it's important to understand that the true value being created for America goes well beyond the direct investment and creation of jobs in factories that produce solar panels," said Mike Koralewski, chief supply chain officer, First Solar. "Our fully vertically integrated factories must be served by robust, domestic supply chains that produce vital components such as glass and steel and even wooden crates, while supporting thousands of American jobs. We are pleased to welcome the Vitro Meadville Plant to the First Solar network of suppliers. Once the facility is commissioned, its workers will join thousands of American solar workers in enabling our country's energy transition."

Vitro's investment in the Meadville Plant is expected to provide First Solar with a vital domestic source of float glass, which is a significant component of the company's advanced thin film solar panels. Since August 2022, First Solar, the largest solar manufacturer in the Western Hemisphere, has embarked on an expansion plan that is expected to grow its existing annual nameplate capacity from approximately 6 gigawatts (GW)DC currently to over 10 GWDC by 2025, by expanding its capacity in Ohio and adding a new manufacturing facility in Alabama.

"We are committed to being a valued supplier to First Solar and a partner in their efforts to bring more clean, renewable energy capacity to the U.S and more broadly, North America," said Ricardo Maiz, President of Vitro Architectural Glass. "This represents a pivotal moment in Vitro's history, and we're proud to play a role in helping to bring our technical expertise in glass manufacturing to the solar PV industry. In 2020, Vitro Meadville's Line 2 was at the end of its useful life when it was also impacted by the automotive industry supply chain disruptions due to the COVID-19 pandemic. We're very pleased to have the opportunity to bring this line back into production and contribute to the revitalization of manufacturing in the U.S. and Western Pennsylvania," said Maiz.

Vitro's Meadville plant is strategically located to serve First Solar's production and already has the necessary raw mate-

rials required to support their production. Production is expected to begin in the second quarter of 2025, resulting in the creation of approximately 130 full-time jobs.

ŞİŞECAM CHAIRMAN ELECTED "GLASS PERSON OF THE YEAR 2023"

Şişecam's Chairman and Executive Member of the Board Cavaliere Dr Ahmet Kirman has been honoured for his long-term valuable contributions to the glass industry and elected "Glass Person of the year 2023" by the Phoenix Award Committee. Outstanding personalities in the glass industry have been awarded with the Phoenix since 1971.



Dr Kirman said, "Glass is a miraculous material that has no substitute. With a history of 5,000 years, glass has always been the most valuable material for civilizations. From this perspective serving the glass industry is a great way of serving humanity. It is the most sustainable solution for mitigating risks, and it promises a brighter future. I am very honoured to be awarded one of the most prestigious awards of the glass industry."

Phoenix Award Committee Chairman Lincoln Brown explained, "It is the purpose of the Phoenix Award Committee to select, each year, a person now living, who has been active in and has made significant and major contributions to the glass industry. This may be in the field of science, production or education relating to glass, and shall include glass containers, fibre glass, scientific glass, flat glass, tableware, art glass and electronic glass."

Chairman Brown further explained that Dr Kirman had been elected for his relentless engagement not only for Şişecam but for the International Committee of Glass (ICG) together with Professor Alicia Duran, another strong contributor for the "International Year of Glass 2022" by the United Nations.

Early April the Chairman of the Phoenix Award Committee Mr Brown personally visited Şişecam Headquarters to announce that Dr Kirman had been unanimously elected by the Phoenix Award Committee to be the "Glass Person of the Year 2023."

Dr Kirman thanked Committee Chairman Brown for his personal coming and Dr Diane Nicklas who takes care of the organization of the ceremony. The award-giving ceremony will take place in Italy on 29 September 2023. Dr Kirman, who has been serving the glass industry since 2006, was recognized for his contributions many times. In recognition of his outstanding lifetime contributions to the glass science and technology, encouraging the exchange of knowledge and promotion of domestic and international glass community, Dr Kirman was honoured

with the "President's Award" by the International Commission on Glass (ICG) in 2019. ICG is the most reputable and recognized worldwide organization in the field of glass with representatives from thirty-three countries.

Dr Kirman has been awarded with the honour of "Cavaliere" by "the Order of the Star of Italy," nominated by the Minister of Foreign Affairs and bestowed by the President of the Italian Republic, for his contributions to the strengthening of economic bilateral relations and mutual investments between Italy and Turkey.

Dr Kirman has also been honoured by the President of Tatarstan with the "Medal of Valorous Labour" in recognition of his valuable contributions to the development of investments and economic cooperation with Tatarstan. He has been honoured with the "Medal of Appreciation" for his contributions to the economic development of the Targovishte Region in Bulgaria. He was also awarded the "Chairman of the Year" at the Le Fonti Awards, the award platform of one of the leading economics media organizations in Italy.

GLAS TRÖSCH: ZIG-ZAG GLASS SOLUTION FOR BRUNEL UNIVERSITY LONDON

Sheppard Robson developed the master plan for the campus of Brunel University in London in the 1960s, and he returned again and again for more minor planning services, most recently, for the conversion of the Wilfred Brown Building as the new home for the College of Engineering, Design and Physical Sciences.



Stripped down to its concrete frame, the London architects gave the building on the western boundary of the university a new, welcoming identity with a glass sawtooth



© Alex Upton

façade. An alternation of transparent glazing to the Northwest and using Glas Trösch's OKATECH Wire Mesh to the west and Southwest results in an architecturally exciting façade interplay.

During the day, it gives the building shell a special glow and the façade has a metallic shimmer in the sunlight. The metal fabric is not only an attractive element of design but it also fulfils high requirements on sun and glare-protection.



AGC DECIDES TO DISCONTINUE PRODUCTION OF LCD GLASS AT KANSAI PLANT

AGC has decided to discontinue the production of LCD glass substrate products at the Kansai plant (Takasago Factory), located in Hyogo prefecture, Japan, by the end of 2023.

The revenues of LCD glass substrate products have been deteriorating since 2022 due to sluggish TV sales as a result of the disappearance of the stay-at-home demand brought about by the Covid pandemic, soaring raw materials and fuel costs, and rising manufacturing costs due to the appreciation of Asian currencies.



As part of measures to improve the profitability of this business, the company is undertaking fundamental structural reform measures, including withdrawal from low-profit size glass substrates and consolidation of production lines, and this decision is part of those measures. Production of other products at the Takasago Factory will continue.

Following this termination of the production, Other Expenses were expected to be incurred at the consolidated financial results for the fiscal year ending December 31, 2023, but the forecast announced on February 8, 2023 remains unchanged.

SAINT-GOBAIN SIGNS RENEWABLE ELECTRICITY SUPPLY AGREEMENT IN INDIA

Saint-Gobain signed a Power Purchase Agreement (PPA) in India with Vibrant Energy – a portfolio company of Macquarie Asset Management’s Green Investment Group (MAM-GIG) – to provide wind and solar energy to 6 local Saint-Gobain sites.



The 20-year PPA begins delivery in 2024 and will bring the renewable electricity share in India to 65 percent in 2025.

Under the agreement, Vibrant Energy will provide Saint-Gobain with 189 GWh of renewable energy (solar and wind) per year, thus reducing Saint-Gobain’s CO2 emissions in India by around 120,000 tonnes per year.

Through wide-ranging initiatives such as the replacement of fossil fuels with biomass, waste heat recovery and reuse, and circularity actions, Saint-Gobain is well on

its way to achieving 100 percent renewable electricity in India by 2030.

This agreement, in addition to those previously signed by the Group in North America, Spain and Poland, is part of the Group’s overall trajectory to achieve carbon neutrality by 2050.

NGA LAUNCHES NEW GLAZIER RECRUITMENT ONLINE RESOURCE

To continue fulfilling its goal of advancing the industry as a viable career path, the National Glass Association (NGA) developed an educational webpage about jobs in the glazing trade. The webpage defines what a glazier is and does and the career opportunities available.

In an effort to support the industry with the ongoing labor shortage, the new webpage promotes the glazing trade to those looking for jobs in construction but may not be aware of the glass industry. It will be referenced from job boards and career information resources. NGA is committed to helping industry companies with bringing new people into the trade and increasing awareness of glass and glazing jobs through this webpage and other existing resources.



TVITEC’S GLAZING FOR L’OREAL SPAIN HQ WINS ISOLAR AWARD

The glass solutions provided by Tvitec | Cricursa for the façade of L’Oreal Spain’s new headquarters in Madrid have received recognition in Germany from Isolar Glas, the leading organization of independent European manufacturers of insulating glass. The project presented by the Spanish glass processor has been chosen as the most outstanding of the year in the category of Representative Works with double and triple glazing.

The new offices of the cosmetics multinational, located at Alcalá 546 Street, feature over 5,000 square metres of eco-efficient glass. Tvitec primarily manufactured double glazing units with a special coating that promotes the penetration of natural light while providing excellent solar protection, blocking excessive heat inside.

The Isolar award for the Representative Project of the Year will be shared with Martifer España, the façade company responsible for the entire façade installation, as well as with the architectural firm Fenwick Iribarren, which designed the building. Both were involved in specifying the most suitable glass from both an aesthetic and energy efficiency and sustainability standpoint.

In addition to double glazing for most of the envelope, Tvitec also supplied safety glass for certain areas of the

complex, including 10 millimetre thermally toughened laminated glass with Sentryglass. The Isolar Awards were recently announced at the annual convention held by the organization in the German city of Potsdam. For Tvitec's Commercial Director, Alberto Sutil, this recognition is a source of pride, and he is delighted to share it with the client, Martifer España, and with a nationally and internationally renowned architectural firm like Fenwick Iribarren. Sutil also emphasized the real estate prominence in the project, thanks to the involvement of BNP Paribas Real Estate and Therus Invest.



Image courtesy of © Therus Invest-Paz Sripkova

Tvitec's executive will soon present the distinctive glass icons of these awards to both Martifer and Fenwick Iribarren. L'Oreal's headquarters in Madrid has achieved the highest sustainability and well-being certifications: LEED Platinum and Well.

VITRO INAUGURATES NEW FURNACE AT TOLUCA, MEXICO, PLANT

Mexican glass manufacturer Vitro inaugurated a new glass melting furnace at its Toluca plant, Mexico. The new furnace will increase capacity to serve customers in the Perfumery and Liquor segments by more than 50 percent. Design and construction used state-of-the-art technology to optimize energy consumption and minimize CO₂ emissions.



PILKINGTON UK: ADVANCED GLASS FLOOD WALL TO PROTECT KENDAL, UK

Kendal, located in southern Cumbria, UK, is benefiting from multi-million pounds worth of flood risk investment designed to protect homes and business from flooding. A key design feature of the flood defences is a high-performance glass within a high specification stainless steel frame to protect properties, without spoiling the town's historic beauty and retaining riverside views.

The glass used as part of the innovative flood wall is a bespoke creation developed in collaboration with Pilkington United Kingdom Limited, part of the NSG Group, and chemical and materials manufacturer Kuraray, while the overall elegant flood system was designed and will be installed by Flood Control International.

It features alternating layers of glass and interlayer to create a 35 millimetre laminate, with toughened Pilkington Activ™ as the outer panes and a toughened 12 millimetre Pilkington Optiwhite™ middle pane. The glass panels undergo rigorous strength testing and have the capability to safely hold back water in the event of water levels rising.



Pilkington Activ™ self-cleaning glass reacts with natural daylight to break down and loosen organic dirt, meaning no harsh chemicals or regular

manual cleaning is required. After the dirt is broken down the coating spreads rainwater evenly over the surface of the glass, helping to wash it away, ensuring that locals and visitors have a clear view of the riverside that runs through the centre of the town, as well as its distinctive buildings.

The use of Pilkington Activ™ laminated with Pilkington Optiwhite™ provides functionality and safety, while helping to preserve the appearance of the landscape.

The 39-metre wall adjacent to Stramongate Bridge on the entrance to Gooseholme Park is the first location where the glass panels will be delivered. This section is the first of three locations where glass panels will feature within central areas of the town, comprising part of the 6 kilometres of flood walls and embankments.

Through the phased scheme, the Environment Agency will deliver further flood defences to protect the most vulnerable homes in the area of Burneside, Staveley and Ings. In addition, flood storage in the upper catchment with complimentary Natural Flood Management will slow the flow and provide greater resilience. Once complete, it will reduce the risk of flooding for over 1,480 homes and 1,100 businesses.

EYRISE: SOLAR SHADING GLASS FOR HISTORIC BUILDING RENOVATION

RUSI (the Royal United Services Institute) appointed Eyrise to provide solar shading glass for a new contemporary glazed dome at its historic grade II listed headquarters in central London.

The dome, which will serve as a meeting hub with views of Whitehall, was part of a complete renovation of 61 Whitehall. The building dates back to 1896.



May 2023

RUSI, the world's oldest independent security and defence think-tank, was founded in 1831 by the Duke of Wellington. A British institution operating with an international perspective, it produces cutting-edge research and events focused on UK defence, security and global affairs. RUSI is the podium of choice for world leaders and senior policy makers, and the new dome will become part of the institute's agenda-setting events in the decades to come.



Eyrisse provided 85 square metres of dynamic liquid crystal glazing: 70 double glass panels to be installed within the dome's steel structure, featuring Licrivision technology that enables the glass to offer instant solar shading without compromising on natural daylight. RUSI's glazing features liquid crystal mixture D, which will allow occupants of the dome to experience visual comfort, thermal regulation and colour neutrality. Liquid crystal mixtures have a different bandwidth of light transmission between the brightest and darkest state. Specification is based on the orientation of a building facade to sun exposure.

"This renovation is about bringing our landmark building into the twenty-first century and the new dome will play a huge part in that," said Deborah Pourkarimi, Chief Operating Officer at RUSI. "It's going to be an incredible space, where we will be able to bring people together in the heart of Westminster. In doing so, we'll be shaping conversations and contributing to a safer, more secure and stable world."

The renovation works were completed in the second half of 2023.

"Given the dome will be a hub for discussion and sharing

expertise, it's apt that a clear view to the outside is always maintained, regardless of the shading condition of the glass," said Celine Glipa, CEO of Eyrisse. "Eyrisse will enhance sustainability credentials of the building too, contributing to lower energy consumption as the dome will require less air conditioning and lighting."

Construction company Coniston oversaw the renovation project. Octatube built the steel dome structure and installed the Eyrisse glass.

NSG OPENS PHOTOVOLTAIC SYSTEM IN AKEN AUTOMOTIVE GLASS PLANT

NSG Group announced that the group's automotive glass plant in Aken, Germany, unveiled its brand-new photovoltaic system, marking a major step towards sustainable energy. At the Aken plant, NSG manufactures wind-screens, back-lights and roof glass made of laminated safety glass.

The plant generates renewable solar energy to power operations and to further contribute to the site's climate-neutral production.

Excess energy generated by the system at weekends and during shut-downs is being fed into the public grid.



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SKG - Skill Glass
 Teknik Elmas
 Tesir Makine

COMPLETE BEVELLING LINES

Adelio Lattuada
 Bando Kiko
Bottero
CMS
 Hiseng Glass Machinery
 IOCCO Group
 Lovati
Schiavo
 Teknik Elmas
 Tesir Makine

COMPLETE AUTOMOTIVE GLASS EDGING AND BEVELLING LINES

Adelio Lattuada
 Bando Kiko
 Bavelloni
Bottero
Glaston Group
 Hiseng Glass Machinery
Biesse Group
 IOCCO Group
SKG - Skill Glass
 Teknik Elmas
 Tesir Makine

DOUBLE-EDGE GRINDING MACHINES

Ashton Industrial Sales
B Solution
 Bando Kiko
 Bavelloni
Biesse Group
Bottero
CMS
 Hiseng Glass Machinery
 IOCCO Group
Schiatti Angelo
 Teknik Elmas
 Tesir Makine

VERTICAL-EDGE GRINDING MACHINES

Adelio Lattuada
B Solution
 Bando Kiko
 Bavelloni
Bottero
 Di Gregorio
Forel
Glass Company
Glaston Group
 Hiseng Glass Machinery

Neptun
Schiavo
Schiatti Angelo
 SGM - Special Glass
 Machinery
North Glass Technology
SKG - Skill Glass
 Tesir Makine

GRINDING SPINDLES

Schiavo
 Tecno Glass
 Teknik Elmas

BEVELLING MACHINES FOR ROUND AND SHAPED GLASS

Adelio Lattuada
 Bando Kiko
 Bavelloni
Biesse Group
CMS
 Hiseng Glass Machinery
 Lovati
Schiavo
 Teknik Elmas
 Tesir Makine

STRAIGHT-EDGE BEVELLING MACHINES

Adelio Lattuada
 Bando Kiko
 Bavelloni
Bovone
CMS
Glass Company
 Hiseng Glass Machinery
Schiavo
Schiatti Angelo
 Teknik Elmas
 Tesir Makine

BEVEL POLISHING MACHINES

Adelio Lattuada
 Bando Kiko
 Bavelloni
Biesse Group
Bovone
CMS
 Hiseng Glass Machinery
 Lovati
 Teknik Elmas
 Tesir Makine

STRAIGHT-EDGE ENGRAVING MACHINES

Bavelloni
Biesse Group
Bottero
CMS
SKG - Skill Glass
 Teknik Elmas

SHAPED GLASS ENGRAVING MACHINES

Bavelloni
Biesse Group
Bottero
CMS
 Lovati
 Teknik Elmas
 Tesir Makine

CORNER GRINDING MACHINES

Adelio Lattuada
 Ashton Industrial Sales
B Solution
 Bavelloni
Biesse Group
CMS
 Lovati
 SGM - Special Glass
 Machinery
SKG - Skill Glass
 Teknik Elmas
 Tesir Makine

SHAPED GLASS GRINDING MACHINES

Adelio Lattuada
 Ashton Industrial Sales
 Bando Kiko
 Bavelloni
Biesse Group
Bottero
CMS
Forel
Glass Company
 Hiseng Glass Machinery
 Lovati
 Teknik Elmas
 Tesir Makine

BELT GRINDING MACHINES

Adelio Lattuada
 Ashton Industrial Sales
 Fenzi
 Hiseng Glass Machinery
 IOCCO Group
 Si.Ste

LATHES - VERTICAL AND HORIZONTAL

CMS
 Fenzi
 Teknik Elmas
 Tesir Makine

EMBOSSING MACHINES

CMS
 Fenzi

PORTABLE MACHINES

Fenzi
Helios Quartz
 Si.Ste
 Tecno Glass

DIAMOND TOOLS

Adelio Lattuada
 ADI - Surface Group
 Ashton Industrial Sales
 Bando Kiko
Bovone Diamond Tools
Bottero
 Diamut - Biesse
 Fenzi
Glaston Group
 Marrose Abrasives
Mole Moreschi
Neptun
Schiavo
Talamoni
 Teknik Elmas
 Vincent - Surface Group

DIAMOND BELTS

Mole Moreschi
SEAMING LINES
 Ashton Industrial Sales

MANUAL LINES

Ashton Industrial Sales

POLISHING WHEELS

Adelio Lattuada
 ADI - Surface Group
 Bando Kiko
Bovone Diamond Tools
 Diamut - Biesse
 Dogo
 Fenzi
Glaston Group
Italmole
 Marrose Abrasives
Mole Moreschi
 RBM Italia - Surface Group
Schiavo
 Si.Ste
 Teknik Elmas
 Vincent - Surface Group

POLISHING AGENTS AND OXIDES

ADI - Surface Group
Bovone Diamond Tools
 Fenzi
Schiavo
 Teknik Elmas
 Vincent - Surface Group

POLISHING BELTS

Di Gregorio
 Fenzi
Schiavo
 Si.Ste

COOLANTS

Adelio Lattuada
Bovone Diamond Tools
 Fenzi
Schiavo

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GLASS GRINDING AND BEVELLING COOLANTS

Schiavo
Teknik Elmas

SEPARATORS FOR GLASS-SOLIDS

Ashton Industrial Sales
Dieffe Macchine
Filtraglass
Immes
Schiavo
Vitrosep

ACCESSORIES

ADI - Surface Group
CMS
Fenzi
Helios Quartz
IOCCO Group
Mole Moreschi
Schiavo
Schiatti Angelo
Teknik Elmas
Vincent - Surface Group

Washing

HORIZONTAL WASHING MACHINES

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

VERTICAL WASHING MACHINES

Adelio Lattuada
Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
ECOL
Forel
Glass Company
Glaston Group

GPM Automation

Hiseng Glass Machinery
IOCCO Group
Lisec Group
Neptun
Schiavo
SGM - Special Glass
Machinery
North Glass Technology
Si.Ste
Stefiglass
Teknik Elmas
Tesir Makine
Triulzi

WASHING MACHINES FOR AUTOMOTIVE GLASS

Bando Kiko
ECOL
Glaston Group
IOCCO Group
Tesir Makine
Triulzi

WASHING PURIFICATION SYSTEMS

Dieffe Macchine
Forel
Glass Company
Glaston Group
Immes
IOCCO Group
Schiavo

LIQUID WASHING CONCENTRATES

Schiavo

ACCESSORIES

Helios Quartz
Idrotecnica
Neptun
Schiavo

Mirror production

COMPLETE PLANTS & CONVEYORS FOR MIRROR PRODUCTION

Bovone
IOCCO Group
Triulzi

PAINTING EQUIPMENT

Fenzi
IOCCO Group
Triulzi

DRYING OVENS

Bovone
CMS

AUTOMOTIVE MIRROR BENDING FURNACES

Bovone
Marposs
Tecnosens

MANUAL SILVER- SPRAYING EQUIPMENT

Fenzi
Glass Company

PAINTS AND CHEMICAL PRODUCTS

Fenzi

ACCESSORIES

Fenzi
Helios Quartz

Insulating glass

COMPLETE INSULATING GLASS LINES

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Forel
Glass Company
Glaston Group
Marval
Neptun
Schiavo
SGM - Special Glass
Machinery
Thermoseal Group
Triulzi

AUTOMATIC SEALING LINES

Bavelloni
Easy Automation
Forel
Glaston Group
Lisec Group
Marval
Teknik Elmas
Tesir Makine

AUTOMATIC SPACER BENDING MACHINES

Bavelloni
Best Makina
Fenzi
Forel
Glaston Group
IOCCO Group
Lisec Group
Marval
Schiavo
Thermoseal Group

DESICCANT SALT FILLING MACHINES

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Fenzi
Forel
Glaston Group
Lisec Group
Marval
Neptun
Schiavo
Stefani
Tecno Glass
Thermoseal Group
Triulzi

SPACER CUTTING SAWS

Ashton Industrial Sales
Bavelloni
Best Makina
Di Gregorio
Fenzi
Forel
Lisec Group
Marval
Neptun
Schiavo
Tecno Glass
Tesir Makine
Thermoseal Group

BUTYL EXTRUDERS

Bavelloni
Best Makina
Di Gregorio
Forel
Glaston Group
Lisec Group
Marval
Neptun
Schiavo
Si.Ste
Stefani
Tecno Glass
Thermoseal Group
Triulzi

HOT-MELT EXTRUDERS

Bavelloni
Best Makina
Di Gregorio
Easy Automation
Fenzi
Forel
Lisec Group
Marval
Neptun
Schiavo
Si.Ste
Stefani
Tecno Glass
Thermoseal Group
Triulzi

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Bavelloni
Best Makina
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Fenzi
Forel
Glaston Group
Lisec Group
Marval
Schiavo
Tecno Glass

POLYURETHANE ENCAPSULATION

Glaston Group
Lisec Group
Marval
Schiavo

SILICONE EXTRUDERS

Best Makina
Di Gregorio
Fenzi
Forel
Glaston Group
Lisec Group
Marval
Schiavo
Tecno Glass
Triulzi

POLYSULPHIDE SEALANT EXTRUDERS

Best Makina
Fenzi
Forel
Glaston Group
Lisec Group
Marval
Schiavo
Stefani
Tecno Glass
Triulzi

GAS FILLING EQUIPMENT

Di Gregorio
Fenzi
Forel
Glaston Group
Lisec Group
Marval
Neptun
Schiavo
Si.Ste
Sparklike
Stefani
Tecno Glass
Thermoseal Group

DESICCANT SALTS

Ashton Industrial Sales
Di Gregorio
Fenzi
Neptun
Schiavo

Stefani
Tecno Glass
Thermoseal Group

SPACERS/PROFILES

Ashton Industrial Sales
Edgetech Europe
Fenzi
Schiavo
Tecno Glass
Thermoseal Group

GEORGIAN BARS

Ashton Industrial Sales
Hegla
Tecno Glass
Thermoseal Group

BUTYL

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Fenzi
Stefani
Thermoseal Group

POLYSULPHIDE SEALANTS

Fenzi
Stefani

HOT MELT

Ashton Industrial Sales
Fenzi
Stefani
Thermoseal Group

OTHER SEALANTS

Fenzi
Stefani

PANTOGRAPHS

Fratelli Pezza

ACCESSORIES

Ashton Industrial Sales
Deltamax Automazione
Forel
Helios Quartz
Schiavo
Sparklike
Stefani
Tesir Makine
Triulzi

Tempering

TEMPERING FURNACES (ARCHITECTURAL GLASS)

Glass Company
Glasstech Inc.
Glaston Group
Hornos Industriales Pujol
Jinglass
Keraglass
Landglass Technology

Lisec Group
Mappi International
Marposs
North Glass Technology
Schiavo
Tecnosens
Tekno Kilns
Texpack

TEMPERING FURNACES (AUTOMOTIVE GLASS)

Glass Company
Glasstech Inc.
Glaston Group
Jinglass
Keraglass
Landglass Technology
Mappi International
Marposs
Mazzaroppi Engineering
North Glass Technology
Satinal
Taifin
Tecnosens
Texpack

CHEMICAL TEMPERING EQUIPMENT

Glass Company
R.C.N. Solutions

ROBOT FOR CLEANING SILICA ROLLERS

Eurotech Way

ACCESSORIES

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

Bending

BENDING FURNACES (ARCHITECTURAL GLASS)

Hornos Industriales Pujol
Jinglass
Keraglass
Mappi International
Marposs

Mazzaroppi Engineering
R.C.N. Solutions
Tecnosens
Tekno Kilns
Texpack

BENDING FURNACES (AUTOMOTIVE GLASS)

Glass Company
Glasstech Inc.
Glaston Group
Jinglass
Keraglass
Mappi International
Marposs
Mazzaroppi Engineering
R.C.N. Solutions
Satinal
Si.Ste
Taifin
Tecnosens
Texpack

ACCESSORIES

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

Laminated glass production

COMPLETE PLANTS

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

LAMINATED WINDSCREEN BENDING FURNACES

ECOL
Glass Company
Glasstech Inc.

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Glaston Group
Keraglass
Mappi International
Marposs
Taifin
Texpack

AUTOCLAVES

Bürkle
Glass Company
Glaston Group
GPM Automation
Hornos Industriales Pujol
Italmatic
Lisec Group
Triulzi

AUTOCLAVE-FREE LAMINATED GLASS PRODUCTION

Bürkle

CLIMATIC CABINS

Forel
Glaston Group
GPM Automation
IOCCO Group
Lisec Group
Triulzi

INFRARED OVENS

ECOL
Forel
Glass Company
Glaston Group
GPM Automation
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Satinal
Triulzi

MANGLES

GPM Automation

PRESSES/BENDING MACHINES

Forel
IOCCO Group
Lisec Group
Triulzi

RESIN LAMINATING MATERIALS AND EQUIPMENT

IOCCO Group
Satinal
Teknik Elmas
Torgauer Maschinenbau

EVA (ETHYLENE VINYL ACETATE)

Satinal
PVB
Everlam
Kuraray - Trosifol

Marposs
Tecnosens

PVB - SHAPING AND CUTTING EQUIPMENT

Ayrox
ECOL
Forel
Glaston Group
GPM Automation
IOCCO Group
Lisec Group
Softeco

PVB - WIRING TECHNOLOGY FOR HEATABLE LAMINATES

Ayrox
Easy Automation
ECOL
Softeco

EVA (ETHYLENE VINYL ACETATE)

Tecnosens

ACCESSORIES

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

Drilling

AUTOMATIC DRILLING LINES

B Solution
Bando Kiko
Bavelloni
Biesse Group
Glaston Group
Biesse Group
IOCCO Group
Neptun
Schiatti Angelo
SKG - Skill Glass
Teknik Elmas
Tesir Makine
Vismara

MULTI-SPINDLE DRILLING MACHINES

B Solution
Bando Kiko
Bavelloni
Biesse Group

CMS
Glass Company
Glaston Group
Biesse Group
IOCCO Group
Neptun
Schiavo
Schiatti Angelo
SKG - Skill Glass
Teknik Elmas
Tesir Makine
Vismara

DRILLING MACHINES WITH OPPOSITE DRILLING HEADS

B Solution
Bando Kiko
Bavelloni
Biesse Group
Bottero
CMS
Di Gregorio
Fenzi
Glaston Group
Hiseng Glass Machinery
IOCCO Group
Lovati
Neptun
Schiavo
Schiatti Angelo
SKG - Skill Glass
Teknik Elmas
Tesir Makine
Vismara

COLUMN DRILLING MACHINES

B Solution
Bottero
Di Gregorio
Fenzi
Neptun
Schiavo
Si.Ste
Tesir Makine
Vismara

PORTABLE DRILLING MACHINES

CMS
Fenzi
Schiavo
Si.Ste
Teknik Elmas
Tesir Makine

DRILLING AND MILLING MACHINES

Bavelloni
Biesse Group
Bottero
CMS
IOCCO Group
Lovati
Neptun

Schiavo
Teknik Elmas
Tesir Makine
Vismara

DIAMOND DRILLS

ADI - Surface Group
Bovone Diamond Tools
Diamut - Biesse
Fenzi
Glaston Group
Mole Moreschi
Neptun
Schiavo
Si.Ste
Teknik Elmas
Tesir Makine
Vincent - Surface Group

ACCESSORIES

CMS
Fenzi
Neptun
Schiavo
Si.Ste
Teknik Elmas

Other equipment and plants

TURNKEY PLANTS / ENGINEERING - FOR BUILDING GLASS

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

TURNKEY PLANTS / ENGINEERING - FOR AUTOMOTIVE GLASS

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

KEY PLANTS / ENGINEERING - FOR DISPLAY GLASS

Bando Kiko

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Cugher Glass
Marposs
Torgauer Maschinenbau

EDGES ROLLER
COATING
MACHINE

Eurotech Way

WORK CENTRES -
CNC CONTROLLED

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

FLOAT PLANTS/
LINES (EQUIPMENT &
ACCESSORIES)

Bovone
Horn
IOCCO Group

CULLET HANDLING SYSTEMS
ECOL

COMPLETE BATCH PLANTS
Zippe

VACUUM COATING
EQUIPMENT AND PLANTS

Giardina Group Glass Division
Glass Company
North Glass Technology

ENAMELLING EQUIPMENT
AND PLANTS

Giardina Group Glass Division
Glass Company
Rollmac division
of GeMaTa

DRYERS AND ENAMELING
FURNACES

Bürkle
Giardina Group Glass Division

SPRAYING TECHNOLOGY

Bürkle
Giardina Group Glass Division

HOT- AND COLD-END
COATING SYSTEMS AND
MATERIALS (CYD, ROLLERS,
CURTAIN COATERS)

Bürkle
Giardina Group Glass Division

SANDBLASTING SYSTEMS,
EQUIPMENT AND PLANTS -
OPTIMIZERS

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

DIGITAL INKJET PRINTERS

Glass Company
System Ceramics
TecnoFerrari

SCREEN PRINTING
EQUIPMENT
AND PLANTS

Ayrox
COMSS
Cugher Glass
Deltamax Automazione
ECOL
Eurotech Way
Glass Company
Keraglass
North Glass Technology
Rollmac division
of GeMaTa
Softeco
TecnoFerrari

SCREEN PRINTING FRAMES
COMSS

SCREEN PRINTING
DRYING SYSTEMS

COMSS
Cugher Glass
Glass Company
Rollmac division
of GeMaTa

EDGES ROLLER COATING
MACHINE

Giardina Group Glass Division

ACIDING GLASS
EQUIPMENT AND PLANTS

Lisec Group
Rollmac division
of GeMaTa

LASER DECORATING
MACHINES

Ashton Industrial Sales
Glass Company

LASER MARKING

Ashton Industrial Sales

Artistic glass
production

CERMAMIC INKS

Glass Company

CHAMBER ELECTRIC
KILNS

Glass Company
Keraglass
Tekno Kilns

ACCESSORIES

Deltamax Automazione
Helios Quartz

CUTTERS

Si.Ste

CUTTING WHEELS

Si.Ste

MANUAL GRINDING
MACHINES

Di Gregorio

UV ADHESIVES

Si.Ste

Miscellaneous

ADHESIVES
FOR GLASS
BONDING

Si.Ste

AUTOMATION

Ashton Industrial Sales
Easy Automation
Horn
IOCCO Group
Marposs
Tecnosens
Torgauer Maschinenbau
Zippe

AUTOMOTIVE
GLASS APPROVAL
SERVICES

Ayrox
Marposs
Softeco
Tecnosens
Teknik Elmas

AUTOMOTIVE GLASS
QUALITY CONTROL

Ayrox

Bando Kiko
Cugher Glass
Deltamax Automazione
Glaston Group
IOCCO Group
Marposs
Softeco
Tecnosens

CE MARKING - QUALITY
CONTROL EQUIPMENT FOR
GLASS IN BUILDING

Ayrox
Softeco

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

Bürkle

COLOURS & ENAMELS -
OTHER APPLICATIONS

Ayrox

CUTTERS

Tesir Makine

CUTTING WHEELS

Teknik Elmas
Tesir Makine

DEIONIZING AND
WATER
SOFTENING
EQUIPMENT

Fenzi
Forel
Glass Company
Idrotecnica
Lisec Group
Triulzi

DEIONIZING
AND WATER SOFTENING
EQUIPMENT

Immnes

DIAMOND ROUTER
EQUIPMENT - PORTABLE

Teknik Elmas
Tesir Makine

FLAT GLASS QUALITY
CONTROL DEVICES

Ayrox
Deltamax Automazione
Forel
IOCCO Group
Marposs
Softeco
Tecnosens

FURNACES

Glass Company

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Horn Texpack

FURNACES / HYDROGEN GENERATORS (WATER ELECTROLYSERS)

Nel Hydrogen

GLASS COATING AND TINTING

Bürkle

Glass Company
Rollmac division
of GeMaTa

GLASS TREATMENT FILMS

Glass Company

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

Horn
Keraglass
Texpack

HINGES FOR GLASS DOORS

Si.Ste

INSPECTION INSTRUMENTS & INTENSIMETERS

Marposs
Tecnosens

INFRARED TUBES

Helios Quartz
Deltamax Automazione

KILNS

Glass Company
Keraglass
Lisec Group
Tekno Kilns
Fenzi

METAL ACCESSORIES

Si.Ste
Teknik Elmas
Tesir Makine

METALLIC SECTIONS

Fenzi
Tesir Makine

NUMERICAL CONTROL SYSTEM (CNC) FOR ALL GLASS PROCESSING MACHINES

Glass Company
IOCCO Group
Prodim

OPTICAL DISTORTION ANALYSERS FOR AUTOMOTIVE GLASS

IOCCO Group
Keraglass
Tecnosens

OPTICAL INFRARED THERMOMETERS

Optris

POWDER OR LIQUID APPLICATION SYSTEMS FOR PROTECTING FLOAT GLASS

BOST
Cugher Glass
Glass Company

PUMPING AND APPLICATION SYSTEMS (AUTOMOTIVE GLASS)

IOCCO Group

PURIFIERS FOR REFLUENT WATER

Dieffe Macchine
Immnes

PUTTIES AND SEALANTS

Fenzi

QUARTZ EQUIPMENT

Helios Quartz

SHAPE CHECKING DEVICES

Easy Automation
IOCCO Group

RAW MATERIALS

BOST

SHOWER ENCLOSURES

Vismara

SIC HEATERS

Helios Quartz

SOFTWARE SYSTEMS FOR PRODUCTION CONTROL

A+W Software
CMS
Cugher Glass
Deltamax Automazione
Edgetech Europe
Forel
Lisec Group
Optima
Prodim

SOLDERING EQUIPMENT FOR ELECTRICAL CONNECTORS FOR WINDSCREENS AND BACKLITES

Ayrox
Easy Automation
Softeco

SORTING SYSTEMS

Glaston Group
GPM Automation
Lisec Group

SURFACE STRESS MEASUREMENT INSTRUMENT

Ayrox
Glass Company
Tecnosens

WINDSCREEN STRESS MEASUREMENT INSTRUMENT

Tecnosens

WINDSCREEN AND BACKLITES

Marposs
Tecnosens

TESTING FOR SOLDERINGS

Ayrox
Easy Automation
Softeco

TESTING DEVICES OF BACKLITES ELECTRICAL HEATING

Ayrox
Easy Automation
Softeco

THERMAL IMAGING SYSTEMS

Glass Company
Easy Automation
Optris

TIN FLOAT BATH FURNACES

Horn
IOCCO Group

TIN FLOAT BATH SIDE DETECTION DEVICES

Tecnosens

TRADE ASSOCIATIONS

Teknik Elmas
Tesir Makine

UV LAMPS

Helios Quartz

UV PORTABLE MACHINES

Helios Quartz

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AN INDUSTRY CONVERSATION ABOUT THE LATEST WINDSHIELD TECHNOLOGIES AT WHICH LEADING EXPERTS WILL OFFER KEY INSIGHTS INTO HOW TODAY'S INNOVATIONS ARE TRANSFORMING THE AUTOMOTIVE SECTOR

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E-TECH.SHOW/SMART-GLASS-FORUM

ALPHABETICAL INDEX

| Companies | State | Pag |
|---|----------------------------|-----|
| A. JACOVIDES LTD | CYPRUS | 146 |
| A+W SOFTWARE AUSTRALIA | AUSTRALIA | 144 |
| A+W SOFTWARE FRANCE | FRANCE | 147 |
| A+W SOFTWARE LATIN AMERICA | MEXICO | 151 |
| A+W SOFTWARE POLSKA | POLAND | 152 |
| A+W SOFTWARE SWEDEN | SWEDEN | 155 |
| A+W SOFTWARE UK | UNITED KINGDOM | 157 |
| A+W SOFTWARE USA - VELA US HOLDCO INC. | USA | 157 |
| ABITARE CG SRL | ROMANIA | 153 |
| ADETEC - GRUPO ADA DISTRIBUCIONES | SPAIN | 154 |
| ADVANCED MATERIAL RESOURCE INC. | SOUTH KOREA | 154 |
| ALUMACH PTY LTD | AUSTRALIA | 144 |
| AMN MOLDOVA SRL | ROMANIA | 153 |
| APPGLASS SL | SPAIN | 154 |
| APPGLASS SL | PORTUGAL | 152 |
| ART MED SRL | TUNISIA | 156 |
| ART MED SRL | LIBYA | 150 |
| ART MED SRL | ALGERIA | 144 |
| ART MED SRL | MOROCCO | 151 |
| ARVIS SH. P. K. | ALBANIA | 144 |
| ARVIS SH.P.K. | KOSOVO | 150 |
| BIESSE - INTERMAC FRANCE | FRANCE | 147 |
| BOTTERO DO BRASIL | BRAZIL | 145 |
| BOTTERO FLAT GLASS INC. | USA | 157 |
| BOTTERO FRANCE | FRANCE | 147 |
| BOTTERO GLASS INDUSTRY CO. LTD. | CHINA | 146 |
| BOTTERO GLASS INDUSTRY CO. LTD. | CAMBODIA | 145 |
| BOTTERO GLASS INDUSTRY CO. LTD. | TAIWAN | 155 |
| BOTTERO GLASS INDUSTRY CO. LTD. | THAILAND | 155 |
| BOTTERO GMBH | GERMANY | 148 |
| BOTTERO UK LIMITED | UNITED KINGDOM | 157 |
| BOVONE MÁQUINAS E EQUIP. INDUSTRIAIS LTDA | BRAZIL | 145 |
| BOVONE NORTH AMERICA | USA | 158 |
| CASA FIGINI | ARGENTINA | 144 |
| CASTRO GLASS SL | SPAIN | 154 |
| CERTECH IMPIANTI DE MÉXICO | MEXICO | 151 |
| CIGTRA | COLOMBIA | 146 |
| CIGTRA | ECUADOR | 147 |
| CIGTRA | VENEZUELA | 158 |
| CMS FRANCE | FRANCE | 147 |
| CMS NORTH AMERICA INC. | USA | 158 |
| CONCEPT SOLUTIONS | TURKEY | 156 |
| CORPOTRADE CYPRUS LTD. | CYPRUS | 146 |
| CORPOTRADE EGYPT | EGYPT | 147 |
| CORPOTRADE JEDDAH | SAUDI ARABIA | 153 |
| CORPOTRADE L.L.C. DUBAI | UAE - UNITED ARAB EMIRATES | 156 |
| CORPOTRADE S.A.R.L. | LEBANON | 150 |
| CORPOTRADE SAUDIA L.L.C. | SAUDI ARABIA | 153 |
| CORPOTRADE SYRIA | SYRIA | 155 |
| CORRENS CORPORATION | JAPAN | 149 |
| COVADIS SARL | FRANCE | 147 |
| CUSTOM GLASS MACHINERY | USA | 158 |
| CVMI SARL | FRANCE | 148 |
| CY HANK INDUSTRIAL CO LTD | TAIWAN | 155 |
| DE GORTER INC. | USA | 158 |
| DG TECH GEORGE DIKAIOS | GREECE | 148 |
| DMT DIAMANT & MASKIN-TEKNIK APS | DENMARK | 155 |

Sales Network SUPPLIERS GUIDE

| Companies | State | Pag |
|--|----------------------------|-----|
| DMT DIAMANT & MASKIN-TEKNIK APS | SWEDEN | 155 |
| DROLET EQUIPEMENT | CANADA | 146 |
| DUMATEK SARL | FRANCE | 148 |
| EBCOTECH MACHINERY SDN BHD | MALAYSIA | 150 |
| EBCOTECH MACHINERY SDN BHD | SINGAPORE | 153 |
| EBCOTECH MACHINERY SDN BHD | INDONESIA | 149 |
| EDGETECH BENELUX | BELGIUM | 145 |
| EDGETECH EASTERN EUROPE | KAZAKHSTAN | 150 |
| EDGETECH EASTERN EUROPE | POLAND | 152 |
| EDGETECH EASTERN EUROPE | UKRAINE | 157 |
| EDGETECH EASTERN EUROPE | UZBEKISTAN | 158 |
| EDGETECH GERMANY | GERMANY | 148 |
| EDGETECH GERMANY | AUSTRIA | 144 |
| EDGETECH GERMANY | SWITZERLAND | 155 |
| EDGETECH MIDDLE EAST | UAE - UNITED ARAB EMIRATES | 157 |
| EDGETECH NORTHERN EUROPE - SINCHRIJO AGENTURER | SWEDEN | 155 |
| EDGETECH NORTHERN EUROPE - SINCHRIJO AGENTURER | LATVIA | 150 |
| EDGETECH SOUTHERN EUROPE - TOMMASO PASCUCCI | ITALY | 149 |
| EDGETECH SOUTHERN EUROPE / MR. FABRICE KELLER | FRANCE | 148 |
| EDGETECH UK | UNITED KINGDOM | 157 |
| EDGETECH UK | IRELAND | 149 |
| ELEGANT GLASS TRADING PTY LTD | AUSTRALIA | 144 |
| ESTE TEAM D. O. O. | SERBIA | 153 |
| ESTE TEAM D. O. O. | CROATIA | 146 |
| ESTE TEAM D. O. O. | BOSNIA AND HERZEGOVINA | 145 |
| ESTE TEAM D. O. O. | MONTENEGRO | 151 |
| ESTE TEAM D. O. O. | MACEDONIA | 150 |
| ESTE TEAM D. O. O. | SLOVENIA | 154 |
| ESTE TEAM D. O. O. | ALBANIA | 144 |
| ESTE TEAM D. O. O. | BULGARIA | 145 |
| ESTE TEAM D. O. O. | HUNGARY | 149 |
| ESTONEGLASS | ESTONIA | 147 |
| ESTONEGLASS | LATVIA | 150 |
| EURO WORK SOLUCOES PARA VIDRO | BRAZIL | 145 |
| EUROTECHCORP | VIETNAM | 158 |
| EUROTECHCORP | CAMBODIA | 145 |
| EUROTECHCORP | PHILIPPINES | 152 |
| EUROTECHCORP | SINGAPORE | 153 |
| EUROTECHCORP | THAILAND | 155 |
| EUROTECHCORP | MALAYSIA | 151 |
| EUROTECHCORP | INDONESIA | 149 |
| EWCOO S.R.O. | CZECH REPUBLIC | 147 |
| EWCOO S.R.O. | SLOVAKIA | 153 |
| FABIO ZUCAL | ITALY | 149 |
| FG TRADING (FRASER GLOBAL TRADING) | REP. OF SOUTH AFRICA | 152 |
| FGI - FLAT GLASS INTERNATIONAL LTD | TURKEY | 156 |
| FIRST GLASS | TURKEY | 156 |
| FLAT GLASS SOLUTIONS | UNITED KINGDOM | 157 |
| FOREL AFRICA | REP. OF SOUTH AFRICA | 152 |
| FOREL CANADA | CANADA | 146 |
| FOREL NORTH AMERICA | USA | 158 |
| FOREL UK & IRELAND | UNITED KINGDOM | 157 |
| FORMATOR - SIGURNOSNA STAKLA DOO | CROATIA | 146 |
| FÜLDNER MACHINES BV | THE NETHERLANDS | 156 |
| FÜLDNER MACHINES BV | AUSTRIA | 144 |
| FÜLDNER MACHINES BV | BELGIUM | 145 |
| FÜLDNER MACHINES BV | GERMANY | 148 |
| FÜLDNER MACHINES BV | LUXEMBOURG | 150 |
| FÜLDNER MACHINES BV | SWITZERLAND | 155 |
| G&N VENTURES | INDIA | 149 |
| GIL BARBARA SRL | ARGENTINA | 144 |

SUPPLIERS GUIDE Sales Network

| Companies | State | Pag |
|--------------------------------------|----------------------------|-----|
| GKSERVICE | BELGIUM | 145 |
| GKSERVICE | LUXEMBOURG | 150 |
| GKSERVICE | THE NETHERLANDS | 156 |
| GLAS X GLASTEKNIK | DENMARK | 147 |
| GLAS X GLASTEKNIK | SWEDEN | 156 |
| GLASMIK DOO | SLOVENIA | 154 |
| GLASMIK DOO | BOSNIA AND HERZEGOVINA | 146 |
| GLASMIK DOO | CROATIA | 146 |
| GLASMIK DOO | MACEDONIA | 150 |
| GLASMIK DOO | MONTENEGRO | 151 |
| GLASMIK DOO | SERBIA | 153 |
| GLASMIK DOO | BULGARIA | 145 |
| GLASMIK DOO | KOSOVO | 150 |
| GLASMIK DOO | SLOVAKIA | 153 |
| GLASS DESIGN (PTY) LTD | REP. OF SOUTH AFRICA | 152 |
| GLASS EXPER - SELCUK GENC | TURKEY | 156 |
| GLASSAMERICA SL | MEXICO | 151 |
| GLASSCORP LTD. | NEW ZEALAND | 151 |
| GLASSMAK | POLAND | 152 |
| GLASSPRO UAB | LITHUANIA | 150 |
| GLASSPRO UAB | FINLAND | 147 |
| GLASSPRO UAB | BELARUS | 145 |
| GLASSPRO UAB | NORWAY | 151 |
| GLASSPRO UAB | SWEDEN | 155 |
| GLASSPRO UAB | UKRAINE | 157 |
| GLASSTOOLS DE COLOMBIA LTDA | COLOMBIA | 146 |
| GLASTECHNIK HOLGER KRAMP GMBH | GERMANY | 148 |
| GMT-BULGARIA LTD. | BULGARIA | 145 |
| GRAND MINATOR | GREECE | 148 |
| GRAND MINATOR PROMOTIONS LTD | CYPRUS | 146 |
| GRUPO ADA DISTRIBUCIONES TECNICAS SL | SPAIN | 154 |
| GULF STAR ENTERPRISE | UAE - UNITED ARAB EMIRATES | 157 |
| GULF STAR ENTERPRISE | BAHRAIN | 144 |
| GULF STAR ENTERPRISE | OMAN | 151 |
| GULF STAR ENTERPRISE | QATAR | 152 |
| HECMAQ SAC | PERU | 152 |
| HEGLA CORP. | USA | 158 |
| HEGLA FRANCE S.A.R.L. | FRANCE | 148 |
| HEGLA MACHINERY (UK) LTD | UNITED KINGDOM | 157 |
| HEGLA MASCHINENBAU GMBH & CO. | GERMANY | 148 |
| HEGLA POLSKA | POLAND | 152 |
| HELIOS QUARTZ AMERICA INC. | USA | 158 |
| HELIOS QUARTZ ASIA LTD. | HONG KONG - CHINA | 149 |
| HELIOS QUARTZ TURKEY | TURKEY | 156 |
| HM GLASS UNIPESSOAL LDA | PORTUGAL | 152 |
| IBA MIDDLE EAST FZE | UAE - UNITED ARAB EMIRATES | 157 |
| IBA MIDDLE EAST FZE | SAUDI ARABIA | 153 |
| IBA MIDDLE EAST FZE | KUWAIT | 150 |
| IBA MIDDLE EAST FZE | BAHRAIN | 144 |
| IBA MIDDLE EAST FZE | OMAN | 151 |
| IBA MIDDLE EAST FZE | QATAR | 152 |
| IBA MIDDLE EAST FZE | YEMEN | 158 |
| IDELIS UAB | LITHUANIA | 150 |
| IDELIS UAB | BELARUS | 145 |
| IDELIS UAB | LATVIA | 150 |
| IDELIS UAB | ESTONIA | 147 |
| IDELIS UAB | UKRAINE | 157 |
| IGLASS PRISMA | GREECE | 148 |
| IKATEK | TURKEY | 156 |
| IMPRA SPOL SRO | CZECH REPUBLIC | 147 |
| IMPRA SPOL SRO | SLOVAKIA | 153 |
| IMROGLASS SRL | ROMANIA | 153 |

Sales Network SUPPLIERS GUIDE

| Companies | State | Pag |
|--|----------------------------|-----|
| IMROGLASS SRL | MOLDAVIA | 151 |
| IMROGLASS SRL | HUNGARY | 149 |
| ITALCOMMA SLOVAKIA | SLOVAKIA | 154 |
| ITALCOMMA SLOVAKIA | CZECH REPUBLIC | 147 |
| ITALOTEC MAQUINAS | BRAZIL | 145 |
| ITALPOL | POLAND | 152 |
| JALOGLOSS SL - CASTILLA - LA MANCHA - LEON | SPAIN | 154 |
| JANCO-PHIL IMPEX TRADING | PHILIPPINES | 152 |
| JANCO-PHIL IMPEX TRADING | SRI LANKA | 154 |
| JEENNY TRADING CO. LTD | THAILAND | 155 |
| JLE - J. LEMOS ESTEVES LDA | PORTUGAL | 152 |
| JLE - J. LEMOS ESTEVES LDA | ANGOLA | 144 |
| JLE - J. LEMOS ESTEVES LDA | CAPE VERDE | 146 |
| JLE - J. LEMOS ESTEVES LDA | GUINEA BISSAU | 149 |
| JLE - J. LEMOS ESTEVES LDA | MOZAMBIQUE - AFRICA | 151 |
| JOLICO TRADING | LEBANON | 150 |
| JOLICO TRADING | SAUDI ARABIA | 153 |
| JOLICO TRADING | BAHRAIN | 145 |
| JOLICO TRADING | JORDAN | 150 |
| JOLICO TRADING | IRAQ | 149 |
| JOLICO TRADING | SYRIA | 155 |
| JOLICO TRADING | KUWAIT | 150 |
| JOLICO TRADING | OMAN | 151 |
| JOLICO TRADING | QATAR | 152 |
| JOLICO TRADING FZE | UAE - UNITED ARAB EMIRATES | 157 |
| K&K PROVITRUM GMBH | AUSTRIA | 144 |
| K&K PROVITRUM GMBH | SWITZERLAND | 155 |
| K&K PROVITRUM GMBH | HUNGARY | 149 |
| KERAGLOSS SOUTH AMERICA DO BRASIL LTDA | BRAZIL | 145 |
| KERAGLOSS USA INC. | USA | 158 |
| KPD TECHNO | RUSSIA | 153 |
| KPDT | RUSSIA | 153 |
| LASITEKNO | FINLAND | 147 |
| LASITEKNO | DENMARK | 147 |
| LASITEKNO | NORWAY | 151 |
| LASITEKNO | SWEDEN | 155 |
| LATTUADA NORTH AMERICA INC | USA | 158 |
| LECHNER SRL | AUSTRIA | 144 |
| LECHNER SRL | GERMANY | 148 |
| LECHNER SRL | SWITZERLAND | 155 |
| LEO-TECH | THAILAND | 156 |
| LINKEAST INTERNATIONAL TRADING CO. LTD. | CHINA | 146 |
| LISEC AMERICA, INC. | USA | 158 |
| LISEC AUSTRALIA PTY LIMITED | AUSTRALIA | 144 |
| LISEC DEUTSCHLAND GMBH | GERMANY | 148 |
| LISEC MIDDLE EAST LTD. FZE | UAE - UNITED ARAB EMIRATES | 157 |
| LISEC POLSKA SP. ZO.O. | POLAND | 152 |
| LISEC SHANGHAI TRADING CO. LTD | CHINA | 146 |
| LISEC SOLUTIONS ITALY SRL | ITALY | 149 |
| MAB EXPORT D.O.O. | SLOVENIA | 154 |
| MAB EXPORT D.O.O. | SERBIA | 153 |
| MAPPI AMERICA | USA | 158 |
| MAQUIGLOSS S.A. | SPAIN | 154 |
| MARBOLZ VETROSTILE SA DE CV | MEXICO | 151 |
| MARPOSS AUSTRALIA | SINGAPORE | 153 |
| MARPOSS AUSTRIA GMBH | AUSTRIA | 144 |
| MARPOSS BELGIUM (FLEMISH AREA) | GERMANY | 148 |
| MARPOSS BELGIUM (WALLOON AREA) | FRANCE | 148 |
| MARPOSS BRAZIL | BRAZIL | 145 |
| MARPOSS CAMBODIA | THAILAND | 156 |
| MARPOSS CZECH REPUBLIC | CZECH REPUBLIC | 147 |

SUPPLIERS GUIDE Sales Network

Companies

State

Pag

| | | |
|---|-------------------|-----|
| MARPOSS DENMARK | GERMANY | 148 |
| MARPOSS FINLAND | SWEDEN | 155 |
| MARPOSS FRANCE | FRANCE | 148 |
| MARPOSS GAUGES INDONESIA | INDONESIA | 149 |
| MARPOSS GERMANY | GERMANY | 148 |
| MARPOSS HUNGARY | AUSTRIA | 144 |
| MARPOSS INDIA PVT. LTD. | INDIA | 149 |
| MARPOSS KABUSHIKI KAISHA | JAPAN | 149 |
| MARPOSS KABUSHIKI KAISHA - MALAYSIA BRANCH | MALAYSIA | 151 |
| MARPOSS LAOS | THAILAND | 156 |
| MARPOSS LUXEMBURG | GERMANY | 148 |
| MARPOSS MEXICO | MEXICO | 151 |
| MARPOSS MYANMAR | THAILAND | 156 |
| MARPOSS NETHERLANDS | GERMANY | 148 |
| MARPOSS NEW ZELAND/AUSTRALIA | AUSTRALIA | 144 |
| MARPOSS NORWAY | SWEDEN | 155 |
| MARPOSS PHILIPPINES | SINGAPORE | 153 |
| MARPOSS PORTUGAL | SPAIN | 154 |
| MARPOSS RUSSIA | RUSSIA | 153 |
| MARPOSS SHANGHAI TECHNOLOGIES CO. LTD. | CHINA | 146 |
| MARPOSS SINGAPORE | SINGAPORE | 153 |
| MARPOSS SLOVAKIA | CZECH REPUBLIC | 147 |
| MARPOSS SOUTH KOREA | SOUTH KOREA | 154 |
| MARPOSS SPAIN | SPAIN | 154 |
| MARPOSS SWEDEN | SWEDEN | 155 |
| MARPOSS SWITZERLAND | SWITZERLAND | 155 |
| MARPOSS TAIWAN | TAIWAN | 155 |
| MARPOSS THAILAND | THAILAND | 156 |
| MARPOSS UNITED KINGDOM | UNITED KINGDOM | 157 |
| MARPOSS USA | USA | 158 |
| MARPOSS VIETNAM | VIETNAM | 158 |
| MATARI HOUSE CO. LTD. | JORDAN | 150 |
| MATARI HOUSE CO. LTD. | SYRIA | 155 |
| MATARI HOUSE CO. LTD. | SAUDI ARABIA | 153 |
| MATODI | USA | 158 |
| MATODI | CANADA | 146 |
| MAVETRO | PORTUGAL | 152 |
| MAVHISA S.A.DE C.V. | MEXICO | 151 |
| MCS TECHNO | POLAND | 152 |
| MEKANIKA SP. Z.O.O. | POLAND | 152 |
| MG ASIA LTD. | HONG KONG - CHINA | 149 |
| MODECO GLOBAL | GERMANY | 148 |
| MODECO GLOBAL | AUSTRIA | 144 |
| MODECO GLOBAL | SWITZERLAND | 155 |
| MOTECH MACHINERY SERVICE | THAILAND | 156 |
| MUNIZ REPRESENTACOES | BRAZIL | 145 |
| NINH SERVICE & TRADING DIVISION - HOANG SON CO. LTD | VIETNAM | 158 |
| NTPS GLASS - GRUPO ADA DISTRIBUCIONES | SPAIN | 154 |
| OFICINA COMERCIAL VOILAP | ARGENTINA | 144 |
| OFICINA COMERCIAL VOILAP | CHILE | 146 |
| OFICINA COMERCIAL VOILAP | BOLIVIA | 145 |
| OFICINA COMERCIAL VOILAP | PARAGUAY | 152 |
| OFICINA COMERCIAL VOILAP | URUGUAY | 157 |
| OPTRIS ELECTRONIC TECHNOLOGY CO. LTD. | CHINA | 146 |
| OPTRIS INFRARED SENSING | USA | 158 |
| OSAMU EIRL | PERU | 152 |
| OSAMU EIRL | BOLIVIA | 145 |
| OVERSEAS GLASS AGENCIES | AUSTRALIA | 144 |
| OVERSEAS GLASS AGENCIES | NEW ZEALAND | 151 |
| P.A.L. GLASS MACHINERY LTD | UNITED KINGDOM | 157 |

Sales Network SUPPLIERS GUIDE

| Companies | State | Pag |
|--|----------------------------|------|
| P.A.L. GLASS MACHINERY LTD | IRELAND | 149 |
| PER MORDT A/S | NORWAY | 151 |
| PER MORDT A/S | ICELAND | 149 |
| PER MORDT A/S | SWEDEN | 155 |
| PETER HAWKINS LTD. | UNITED KINGDOM | 157 |
| PETER HAWKINS LTD. | IRELAND | 149 |
| PIETERMAN GLASTECHNIEK / THE NETHERLANDS | THE NETHERLANDS | 156 |
| PIETERMAN GLASTECHNIEK NV - BELGIUM | BELGIUM | 145 |
| POLYCHEM EGYPT | EGYPT | 147 |
| PRO-GLAS | AUSTRIA | 144 |
| PRO-GLAS | GERMANY | 148 |
| PRO-GLAS | SWITZERLAND | 155 |
| PROJECTA GROUP | FINLAND | 147 |
| PROTECH COLOMBIA | COLOMBIA | 146 |
| PROTECH COLOMBIA | ECUADOR | 147 |
| PROTECH COLOMBIA | PANAMA | 152 |
| PROTECH COLOMBIA | VENEZUELA | 158 |
| PROVIGLASS | MEXICO | 151 |
| QUANEX IG SYSTEMS | USA | 158 |
| R. MEYER SL | SPAIN | 154 |
| SATECRIS ENCABO - GRUPO ADA DISTRIBUCIONES | SPAIN | 154 |
| SCHIATTI RUSSIA | RUSSIA | 153 |
| SHENYANG HELIOS TECH. CO. LTD | CHINA | 146 |
| SIMAC ARGENTINA | ARGENTINA | 144 |
| SOLUTEC GLASS | SPAIN | 152 |
| SOLUTEC GLASS | PORTUGAL | 1544 |
| SOLVITEC SAS | COLOMBIA | 146 |
| SORGLAS LTD | TURKEY | 156 |
| STEFANOS THEMELIS | GREECE | 148 |
| STONE & GLASS GROUP | UNITED KINGDOM | 157 |
| SUVISUR SL - ANDALUSIA - ESTREMADURA | SPAIN | 154 |
| TECFORT | THE NETHERLANDS | 156 |
| TECHNIS SAS | FRANCE | 148 |
| TECMAGLASS (DELEGACION SUR) | SPAIN | 154 |
| TEKNIKA | CZECH REPUBLIC | 147 |
| TEKVIMO | SPAIN | 1544 |
| TEKVIMO | PORTUGAL | 152 |
| TGM CO. LTD - TOKYO GLASS MATERIALS | JAPAN | 149 |
| THERAL SPRL | UAE - UNITED ARAB EMIRATES | 157 |
| THERAL SPRL | IRAN | 149 |
| THERAL SPRL | JORDAN | 150 |
| THERAL SPRL | KUWAIT | 150 |
| THERAL SPRL | LEBANO | 150 |
| THERAL SPRL | SAUDI ARABIA | 153 |
| THORNGATE SALES | INDIA | 149 |
| USE ELECTRONICS CO. LTD. / HEADQUARTERS | TAIWAN | 155 |
| USE ELECTRONICS CO. LTD. / THAILAND | THAILAND | 156 |
| VETROTOOLS | ARGENTINA | 144 |
| YGM MAKINA MÜHENDISLIK DIS TICARET LIMITED SIRKETI | TURKEY | 156 |
| YICHEN INFORMATION TECHNOLOGY CO. LTD. | CHINA | 146 |
| YICHEN INFORMATION TECHNOLOGY CO. LTD. | SINGAPORE | 153 |
| YICHEN INFORMATION TECHNOLOGY CO. LTD. | SOUTH KOREA | 154 |
| YICHEN INFORMATION TECHNOLOGY CO. LTD. | MALAYSIA | 151 |
| YKC - YOUNG KYUNG CO. LTD. | SOUTH KOREA | 154 |
| YTA COMPANY (YUTA) | RUSSIA | 153 |
| YTA COMPANY (YUTA) | BELARUS | 145 |
| YTA COMPANY (YUTA) | UKRAINE | 157 |

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Review

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PAGES 160 - 177

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June 2023

LATEST SAINT-GOBAIN GLASS ACHIEVEMENTS DEDICATED TO FAÇADES

Discover Saint-Gobain Glass' new 2022 reference book "GLASS FOR FAÇADE," highlighting the most innovative façade solutions with a selection of iconic architectural projects from all around the world.



Through these extraordinary projects, Saint-Gobain wished to bring to light the know-how of their customers



and partners and the way the clients showcased their best performing glass products as well as many other Saint-Gobain products.

As sustainable development is at the

heart of Saint-Gobain's strategy, a chapter was added dedicated to innovations in sustainability.

Saint-Gobain did a lot to innovate in 2022 with:

- the launch of ORAÉ[®], the glass with the lowest carbon footprint in the world, with a verified EPD and FDES, making it possible, through a range of glazings dedicated to the façade market, to reduce both the embodied carbon footprint and the operational carbon for architectural projects,
- the setting up of the Saint-Gobain Glass Recycling network in several countries to improve cullet collection and rethink the end-of-life of the company's glazing,
- the introduction of an offer of photovoltaic solutions for façades,
- the development of anti-collision glazing solutions (4BIRD[®]) designed to protect birds without compromising the building's technical and aesthetic performance.

GLAS TRÖSCH: BEACONS OF EDUCATION AND ARCHITECTURE

For Columbia University's business school in New York, renowned American architecture firm Diller Scofidio + Renfro worked with FXCollaborative to create two new buildings with a distinctive appearance.

The design's fundamental element is an architecture geared towards transparency and communication that

is intended to have an impact both inside and outside in the neighbourhood.

With a total of 12,700 square metres of insulating glass, BGT Bischoff Glastechnik products

contributed to the university buildings' unique character. The company, which is part of Swiss glass manufacturer Glas Trösch, also supplied the individual components for the façade glass for the upper floors. All areas that appear opaque from the outside, measuring 7,600 square metres, were printed with a ceramic white paint fired into the surface during the tempering process. Some of the particularly weather-resistant, printed outer panes with a total thickness of 23.52 millimetres posed a technical challenge in the manufacturing process because they were given a fixed-size coating externally before lamination. The remaining 5,100 square metres were screen printed around the edges. A further 12,700 square metres of unprinted laminated safety glass, which form the inner panes of the insulating glass units, are spread across the entire surface of the façade.

Design, functionality and sustainability go hand in hand in the two university buildings in New York, which is why the new structures are targeting a Gold LEED v3 certification. The choice of the partially printed insulating glass surfaces also makes a significant contribution to this goal, because the opaque areas of the façades prevent excessive heating of the interior.



© Iwan Baan

ANDREW HARING SHARES FUN AND REALITY OF TESTING BALLISTIC GLASS

NGA's own Andrew Haring, vice president of business development, had a good time testing ballistic glass in Texas, while at the same time amplifying the message that our schools need bullet-resistant glazing.

With reps from NGA member Quikserv, Inc. / United States Bullet Proofing, Haring conducted unofficial testing (to ASTM standards) on UL 752 level 1 and level 8 ballistic glass, courtesy of NGA member Standard Bent Glass / SBG Defense. Texas Glass Association (an affiliated Chapter of NGA) member Sharp Glass fabricated the frame using sticks from NGA member Kawneer Company, Inc.

"Yes, it was fun. More importantly, we're leveraging this



opportunity to...bring attention to the need for bullet-resistant glazing in our schools," said Haring in his LinkedIn post. "We adamantly endorse [congressional bill] H.R. 887: Securing Our Students Act, allocating additional funds to schools for bullet-resistant doors and windows... that meet, at a minimum, the new ASTM standard on active shooter attack."

AGC GLASS EUROPE: PYROBEL GLASS FOR SAFE AND TRANSPARENT PARTITIONS

BNP Paribas Fortis is the largest international bank in Belgium. The new headquarters in Brussels with more than 100,000 square meters of office space was designed as a passive house in a collaboration between Baumschlager Eberle Architects, Styffhals Architects, Jasper-Eyers Architects and the Belgian façade builder Eiffage, which relies on renewable energies and sustainable materials. This includes numerous Cradle to Cradle certified glazings from AGC Glass Europe. The fire-resistant glass "Pyrobel Vision Line 54" has a particularly high level of transparency and structures the office space without any disruptive vertical bars. In the event of a fire, it reliably protects against heat, smoke and fire for up to 120 minutes (EI120).



In the façade, "Stopray Ultra-60 on Clearvision" ensures high daylight transmission, effective sun protection, thermal insulation and colour neutrality - Photo: AGC Glass Europe

In the façade, "Stopray Ultra-60 on Clearvision" ensures high daylight transmission, effective sun protection, thermal insulation and colour neutrality. In the interior, "Lacobel" and "Matelac" design glazing create hygienic and aesthetic surfaces. "Stratophone" soundproof glass ensures acoustic comfort in the offices.

The building received the BREEAM "Excellent" environmental certificate for the materials used, the use of renewable energies and good environmental management.



Pyrobel Vision Line is fireproof on both sides, offers high noise protection, reliable space closure and thermal insulation, high impact safety and can even be equipped with a filter for ultraviolet light - Photo: AGC Glass Europe

SAINT-GOBAIN GLASS STARTS PRODUCTION OF INDIA'S FIRST LOW CARBON GLASS

Addressing the need for low carbon building materials in the Indian Construction Industry, Saint-Gobain India launched the first production of a new glass with a low carbon footprint. The product was estimated for a carbon footprint reduction of approximately 40 percent compared to existing Saint-Gobain Glass India products.



Such environmental performances could be reached thanks to the use of two-thirds of recycled content as raw material, natural gas and electricity from renewable energy sources. Production parameters have been recorded and will be used to obtain a verified EPD that should be published later, confirming the significant carbon footprint reduction. The achievement of Saint-Gobain was the culmination of a substantial R&D effort, the excellence of its industrial teams, and the persistent continuous efforts of achieving the Group's ambition of Net Zero by 2050.

This low carbon glass retains all the technical, quality and aesthetic performance of regular glass, and is expected to be integrated as a substrate option in the energy-efficient glass portfolio of Saint-Gobain Glass. This new low carbon substrate in Saint-Gobain Glass India offer will give a boost to the embodied carbon reduction of buildings alongside the operational energy efficiency performance.

The building industry currently accounts for almost 40 percent of global greenhouse gas emissions and is at the heart of the decarbonization challenge. As stated in the joint study conducted by Engineering consulting firm Arup and Saint-Gobain Glass in 2022 on façades, it is key to act jointly on both reducing operational and embodied carbon. Saint-Gobain Glass advanced Magnetron coating technology can already drastically reduce greenhouse gas emissions caused by artificial cooling and lighting for buildings during the use phase (operational carbon footprint).

By associating energy efficiency performance together with lower embodied carbon in glass, one can contribute to a significant reduction in the whole-life carbon footprint of buildings, while continuing to provide the essential benefits of natural light, solar and thermal comfort for the occupants.

Commenting on this production launch in India, Mr A R Unnikrishnan, Managing Director of Saint-Gobain India - Glass Business, said, "It is not a coincidence that the production launch of India's first low carbon glass is taking

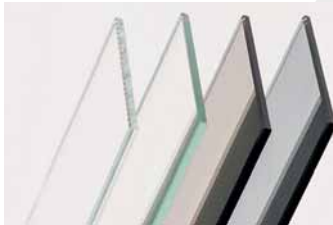


place on 'World Environment Day.' It is a concerted effort from Saint-Gobain to continue to sustainably contribute to the Indian Construction Industry.

"The building materials of the future need to be low carbon to achieve India's commitment as a country towards Net Zero by 2050. This product from Saint-Gobain will accelerate this vision and will actively contribute to Light and Sustainable Construction. In line with our purpose of Making the World a Better Home and achieving our Net Zero goal by 2050, decarbonizing the built environment with sustainable products that will have a lower embodied carbon footprint will be the way forward for us."

AGC GLASS EUROPE RELEASES MIROX 4GREEN+ PREMIUM MIRROR

Mirox 4Green+ was the latest version of AGC Glass Europe's premium lead-free mirror featuring a water-based protective coating and even lower emissions of volatile organic compounds (VOCs). This fully opaque product remains the ideal solution for backlit applications.



© AGC Glass Europe

AGC's range of environmentally friendly mirrors helps preserve air quality in the home while eliminating the use of many toxic products, including copper, ammonia and lead.

Featuring a unique coating of water-based paint, not only does Mirox 4Green+ use 20 percent less paint compared to a standard mirror, but the paint itself contains less than 10 percent organic solvents and the water-based paint's VOC emissions are 80 percent lower than a standard mirror. All this makes Mirox 4Green+ a truly sustainable product, which, with near zero indoor emissions of volatile organic compounds, contributes to good indoor air quality.

In fact, in addition to contributing to the well-being of building occupants, Mirox 4Green+ also improves working conditions on the shop floor. Thanks to its water-based paint, less CO₂ is released during the production process (about 150 g of CO₂ /m² prevented), which in turn contributes to the well-being of workers.

Mirox 4Green+ is a fully recyclable product. It has an even lower environmental impact than Mirox MNGE – which is Cradle to Cradle Certified® Bronze – and will go through the same certification process.

Mirox 4Green+'s fully opaque paint keeps the diffusion of light within the sandblasted part of the glass, provid-



© AGC Glass Europe

ing a superior finish and making it ideal for backlit mirror applications.

Both Mirox 4Green+ and Mirox MNGE are available in four colours: Clear, Clearvision, Bronze and Grey. They can also be ordered in a SAFE+ version for enhanced safety.

GLAS TRÖSCH TO BUILD NEW FACTORY IN STAD LOMMEL, BELGIUM

Swiss Glas Trösch Group announced to plan the building of a new factory for float glass for architectural, building and solar panel industry in Stad Lommel, Belgium, on the 35-hectare brownfield of the former Philips Emgo factory.



The factory will offer 300 direct and about 1,000 indirect jobs. The investment is in the order of several hundreds of millions euro, with first production scheduled during 2025. The production volume will reach the equivalent of glazings for 300,000 housings a year.

Donald Eshuis, project manager & CEO of Scheuten (part of Glas Trösch Group), said,

"In the framework of achieving the European sustainability targets, glass is an important component. The new continuous float factory will supply mainly to flat glass processors & end-users in Belgium and surrounding countries, thus resulting in a significant reduction of CO₂ and carbon in transport."

The former Philips Emgo plant in Lommel was chosen for the new state-of-the art float plant as an ideal combination of the presence of high quality sand (major raw material), availability of multi-modal transport facilities (water, road, train) and the availability of high skilled working force.

Glas Trösch Group was assisted in the search for the new float factory location by LRM (Limburg Regional Investment Company), VLAIO – Flanders Innovation & Entrepreneurship, Flanders Investment & Trade (FIT) and Stad Lommel.

AGC CONTINUES TO EXPAND PRODUCTION OF LOW EMBODIED CO₂ FLOAT GLASS

At its site in Moustier, Belgium, AGC Glass Europe started production of Low-Carbon Planibel Clearlite, a float glass whose CO₂ footprint has been slashed by more than 40 percent. The production of Low-Carbon Planibel Clearlite yields no more than 7 kilograms of CO₂ per square metre for glass that is 4 millimetres thick.

The AGC site in Seingbouse, France, also started producing this same sustainable glass product, marking the next step in the planned long-term Group-wide roll-out. With this



First production run of Low-Carbon Glass in Seingbouse, France

additional production capacity now online, AGC has expanded its Low-Carbon Glass range to include a Low-Carbon variant of Stratobel (safety glass), Stratophone (acoustic glass), iplus (thermal insulation glass), Stopray and Energy (solar control glass), as well as toughenable coatings (T-coatings). The entire range is now available in all thicknesses from 3 to 10 millimetres.

AGC Glass Europe took the next step in its Carbon Neutrality Roadmap by enabling another AGC production facility to produce Low-Carbon Glass. The Group's holistic approach takes the entire value chain into account: decarbonising production processes, reducing CO₂ emissions from the upstream supply chain and cutting other indirect emissions. AGC is effectively leveraging the more sustainable procurement of raw materials, the use of highly efficient melting furnaces that deploy innovative electro-boosting technology, the increased use of recycling via intelligent pre-consumer cullet flows and optimised transport between AGC plants and customers. The Group also promotes the use of renewable energy by not only purchasing green energy but also generating its own green solar and wind power.

Investors and building owners are increasingly demanding that sustainable materials be used in their projects. Sustainable buildings have a smaller ecological footprint, minimise the consumption of non-renewable resources and reduce greenhouse gas emissions. During the construction phase various aspects have to be considered, such as the use of decarbonised materials, recyclability, the reusability of building components and the reduction of waste, both during the construction process and beyond the building's life cycle.



Nervesa 21, office building project in Milan, Italy, Architect: Lombardini22, Investor: Cromwell Group

There are also financial arguments for investors and owners: healthy and ecological buildings deliver higher rents and sales prices, which in turn expands the potential for a long-term increase in the value of the investment. Accordingly, by pursuing sustainable asset port-

folios, investors and fund managers can tackle their scope 3(1) goals, such as tenant emissions and embodied carbon, and improve their ESG credentials.

For AGC Glass Europe, the growing demand for sustainable and decarbonised construction is already being reflected in the first projects specifying AGC Low-Carbon Glass:

UMC Research & Diagnostics Centre, Amsterdam, The Netherlands

UMC Amsterdam has a new research and diagnostics centre, for which they specified 1,600 square metres of Low-Carbon ipasol Ultraselect 62/29 (solar control glass) and Low Carbon Planibel Clearlite (single glass).

Nervesa 21, Milan, Italy

This 10,000 square metre Grade A building in Milan is aiming for the highest ESG credentials and circular economy practices in a sustainable refurbishment process that involves recycling more than 90 percent of the materials removed during the renovation process and sourcing local materials. Some 6,500 square metres of Low-Carbon Stratophone 66.2 and Low-Carbon Planibel Clearlite will be supplied.

Mobilis, Brussels, Belgium

Redevelopment project by D'leteren Immo to create a multifunctional, innovative, flexible and sustainable building that will be both energy-neutral, with BREEAM Outstanding certification, as well as climate-proof. The façade will comprise Low-Carbon Stratobel 44.2 and Low-Carbon Stratophone 44.2.

NDR Fernsehen, Hamburg, Germany

Around 2,000 square metres of Low-Carbon Stratobel iplus 1.1 and Low-Carbon Energy 72/38 were used in the façade of the new NDR programme building in the Lokstedt district of Hamburg.

**OLDCASTLE BUILDINGENVELOPE®
ACQUIRES SYRACUSE GLASS COMPANY**

Oldcastle BuildingEnvelope, Inc. ("OBE") completed the acquisition of Syracuse Glass Company ("SGC"). Founded in 1909, SGC is the leading independent fabricator and distributor of architectural glass and aluminium products serving glazing contractors, manufacturers and glass retailers throughout Upstate New York, Eastern Pennsylvania and New England.

"Syracuse Glass Company has delivered high quality products and excellent customer service in its markets for more than a century," said Bruno Biasiotta, Chief Executive Officer of Oldcastle BuildingEnvelope. "We are excited about the prospect of leveraging our collective cultures and capabilities to build on SGC's great reputation. This acquisition will allow our teams to provide industry-leading glazing solutions to better serve our customers and partners and help them be successful.



Our enhanced presence in the Northeast region of the U.S. will enable OBE and SGC to capitalize on the market opportunity and grow our industry-leading market position.”



Headquartered in Syracuse, New York, SGC offers custom fabricated products, including tempered, laminated and insulating glass, shower enclosures, glass entrances and store-fronts, and custom aluminium entrances and store-fronts.

“Joining OBE will allow us to offer even more support, expertise and value-added product options to better serve our customers,” said John Dwyer, Chief Executive Officer of Syracuse Glass Company. “Our customers can continue to rely on the leading service levels and product quality they have come to expect from SGC. Partnering with OBE, we will remain our customers’ supplier of choice well into the future.”

“We are sincerely pleased to welcome the Syracuse Glass Company team and their culture of performance and teamwork to the OBE family and look forward to partnering with SGC in its next phase of growth,” added Biasiotta.

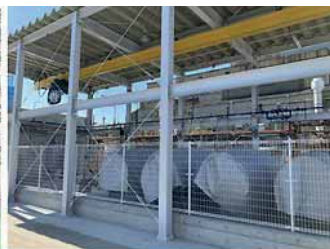
AGC: FIRST TEST OF GLASS PRODUCTION USING AMMONIA AS FUEL IN FURNACE

AGC announced that it succeeded in the world’s first demonstration test of glass production using ammonia as fuel in an actual production furnace under the project entitled “Technology Development for the Utilization and Production of Ammonia as Fuel,” (“the project”) which was undertaken as a commissioned project by New Energy and Industrial Technology Development Organization (NEDO).

The project was a joint technology development effort with Taiyo Nippon Sanso Corporation, the National Institute of Advanced Industrial Science and Technology and National University Corporation Tohoku University.

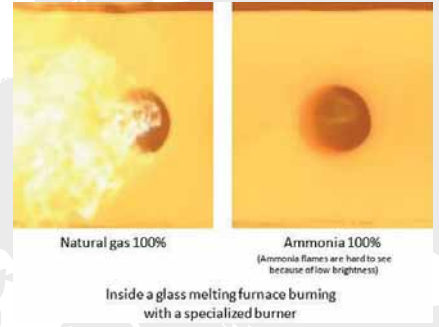


Glass melting furnace in which this demonstration test was conducted



Storage tank for ammonia fuel

For this project, an actual test of ammonia combustion technology was conducted using an ammonia-oxygen burner with low NOx combustion technology developed by Taiyo Nippon Sanso



at the glass melting furnace that produces architectural glass at the AGC Yokohama Technical Centre, and the effects on glass quality and furnace materials, and on control of flame temperature (temperature of flame burning at burner tip installed in furnace), furnace temperature (temperature of gas inside the furnace and inner wall surface) and nitrogen oxide (NOx) emissions were verified.

In the future, the project plans to conduct demonstration tests under various conditions, as well as further scaled-up burner tests and demonstration tests at other AGC sites. By doing so, the aim is to fully introduce ammonia combustion technology into glass melting furnaces after assessing the scope of its application. In the future, the company will also consider expanding its application beyond glass to other materials, such as steel and aluminium, to widely help reduce GHG emissions in the production process of the materials industry.

During this phase, a pair of burners developed by Taiyo Nippon Sanso to prevent a rapid rise in flame temperature through multi-stage combustion were installed in the glass melting furnace (actual production furnace) used to produce architectural glass at the AGC Yokohama Technical Centre, and the world’s first demonstration test using ammonia as fuel was conducted for two days from June 18 to 19, 2023.

In the demonstration test, compared with conventional combustion methods using heavy oil as fuel under various conditions, the effects on the quality of glass, furnace materials, and control of the flame temperature, furnace temperature and NOx emissions were verified. In this test, the NOx concentration in the exhaust gas was found to be below the environmental criterion value while maintaining the required temperature of the glass melting furnace.

The plan for 2023 is to continue conducting technical verification using ammonia as fuel under various conditions, using the glass melting furnace that produces architectural glass at the AGC Yokohama Technical Center. After 2024, plans are to conduct scaled-up burner tests and demonstration tests using glass melting furnaces at other AGC sites. The goal is to fully introduce ammonia combustion technology in 2026 or later after determining the scope of its use.

July 2023

AGC GLASS EUROPE UNVEILS NEW STOPRAY SOLAR CONTROL COATINGS

AGC has expanded its range of solar control glass products to meet growing demand for enhanced-neutrality solar control glazing. With climate change leading to more frequent and longer periods of heat and customers increasingly demanding higher levels of light transmission in order to more effectively and efficiently harness natural daylight, AGC Glass Europe responded by releasing three new Stopray products that focus on delivering high selectivity, a colour-neutral appearance and low reflection.



Stopray Ultraselect 60/27 solar control glass features a triple silver coating that delivers superb selectivity ($S = 2.22$) and an excellent solar factor of just 27 percent, effectively protecting rooms from overheating during the summer and thereby reducing the load on the air-conditioning system. While its high light transmission (60 percent) ensures abundant daylight indoors and bright rooms all year round, its low light reflection of just 11 percent (external) and 15 percent (internal) ensures excellent transparency, which combines with its superb neutrality to deliver an undistorted view. With a U-value of just $1.0 \text{ W}/(\text{m}^2\text{K})$, this product helps prevent rooms from cooling down in cold temperatures, which in turn saves on heating costs and benefits the environment.

Two other additions to the AGC range are Stopray Neutral 60/33(T) and Stopray Neutral 50/27(T), both featuring a double silver coating and superb neutrality, making them ideal for architectural applications. The toughenable (T) versions of both products can be perfectly combined in a façade alongside their non-toughened counterparts since they are identical in appearance and deliver the same visibility. This comes into play, for example, when flat panes are to be installed alongside curved panes in the façade and an identical appearance is required.

Stopray Neutral 60/33(T) delivers excellent light transmission (60 percent) and a high solar factor (33 percent), resulting in bright rooms that are protected from overheating. For even more solar control, Stopray Neutral 50/27(T) still delivers respectable light transmission (50 percent) and even more powerful solar control (27 percent). Its low reflection of just 13 percent (external) and 11 percent (internal) minimises excessive reflection from artificial lighting and delivers superb visibility, especially

at night, while its low U-value of just $1.0 \text{ W}/(\text{m}^2\text{K})$ means lower heating requirements on cold days.

The above values are for double glazing units, but the solar control glass is also available as triple glazing insulating glass units.

All existing products in the Stopray range have been awarded Cradle to Cradle Silver Certification and are also available in low-carbon glass variants as part of AGC's new low- CO_2 production process. By using low-carbon glass, architects and planners can improve the classification of their buildings in environmental certifications awarded under DGNB, LEED, BREEAM, etc.

GLAS TRÖSCH: SEEING THROUGH ECOLOGICAL ARCHITECTURE

Complementing one of the most innovative residential projects in Switzerland – the Les Verges eco-neighbourhood – equally ecologically planned and Minergie-ECO-certified public facilities by Syl-



© Corinne Cuendet

la Widmann Architectes SA on the outskirts of Geneva provide a special link to the adjacent Jura mountains.

A technical school, an elementary school, a gymnasium and other social infrastructure benefit both the students and the neighbourhood. The permeable, pavilion-like ensemble with structures made of concrete and wood bring the various users together not only in the outdoor spaces created by the special building arrangement, but also creates neighbourly connections by the generous use of Glas Trösch's 4-season insulating glass SILVER-STARSELEKT.

SAINT-GOBAIN DIVESTS ITS GLASS PROCESSING BUSINESS IN PORTUGAL

Saint-Gobain signed a binding agreement for the sale of COVIPOR, its glass processing business in Portugal, to PNI Portugal & Permanente SA.

COVIPOR generated sales of around EUR 20 million in 2022, with two industrial locations in the Porto area employing approximately 100 people.

Closing of this transaction was subject to Portuguese antitrust authority clearance and expected in the third quarter of 2023.

This transaction was part of Saint-Gobain's continued business profile optimization strategy, in line with the "Grow & Impact" strategic plan.





AGC IMPLEMENTS ONE OF THE LARGEST ROOFTOP PHOTOVOLTAIC PLANTS IN SPAIN

AGC Flat Glass Ibérica, in collaboration with Helexia España, announced the commissioning of a 4,600 kilowatts photovoltaic plant for self-consumption on an industrial site at the Port of Sagunto, Valencia. The plant has 8,800 photovoltaic modules covering 48,400 square metres of the rooftop, the equivalent of 10 football fields. With an annual production of 7 gigawatt hours, this project will help to avoid the emission of more than 800 tonnes of CO₂ equivalent per year.

Aglobal leader in the glass industry, AGC is at the forefront of developing products with the highest environmental quality and seeks to use technologies and manufacturing processes that minimize its impact. The Group considers Sustainability as a fundamental part of its Corporate Social Values and a prerequisite in all its activities. AGC aims to achieve carbon neutrality by 2050 and has set a transitional target of 30 percent reduction in GHG emissions and a 50 percent reduction in GHG emissions per unit of sales by 2030 (total of Scope 1, 2 and 3; reductions based on the levels of 2019) by using, among other things, energy efficiency solutions and increasing the share of renewable energy in the total energy consumption of its production facilities.



In line with this vision, AGC Flat Glass Ibérica, a subsidiary of AGC, has partnered with Helexia to take advantage of the photovoltaic potential of its largest industrial unit in Spain, which is dedicated to the production of float glass. The photovoltaic power plant, designed and implemented by Helexia España, have been efficiently installed onto the rooftop. Thanks to state-of-the-art components and optimized use of the energy produced, AGC has significantly reduced its dependence on conventional energy sources, strengthening its environmental commitment and reducing its costs. This is the second photovoltaic installation carried out by Helexia for an AGC plant in Spain. The first was a 210-kilowatt plant installed in 2020 at AGC's Pedragosa unit (Barcelona).

Active in Spain since 2019, Helexia has already commissioned 25 projects, five of which are located in the Valencian Community, and has a portfolio of more than 100 megawatt to be developed in the coming years throughout the country. The group will continue to invest more than EUR 1.5 billion through to 2027 in order to support its customers in their energy transition in Europe, with Spain being one of the priority markets.

"We are proud to collaborate with AGC for the development, construction, and operation of this second and even more ambitious project in Spain," said Etienne Le Pargneux, Country Director of Helexia Spain. "We are aware of AGC's commitment to a sustainable economy and today is an important step in accelerating its energy transition. Our mission is to support our clients in reaching their financial and environmental goals, helping them to consume less and better energy."

Davide Cappellino, President of AGC Architectural Glass Europe and Americas, said, "We are taking another important step towards climate neutrality. Together with our partner Helexia, we are tapping into the potential of using as much renewable electricity as possible, as part of AGC's roadmap towards glass production with lower carbon footprint."

SAINT-GOBAIN AND AIR PRODUCTS CONDUCT A LARGE-SCALE HYDROGEN TRIAL

As part of its commitment to reach Net Zero Carbon by 2050, Saint-Gobain engaged in a major transformation process, which included reduction of the carbon footprint of flat glass production. One solution was to substitute natural gas with direct electrical heating and hydrogen combustion.

In March 2023 the flat glass production plant in Herzogenrath, Germany, successfully conducted five-day trials by injecting 30 percent hydrogen in the energy mix of its float furnace. Supported by Air Products, this large-scale trial replaced thirty percent of the total energy consumed by the furnace with pure hydrogen/air combustion.

Air Products supplied the necessary hydrogen and provided the corresponding gas supply from the trailer to the plant.



"The renewal of the furnace is planned for the end of 2027. This deadline matches perfectly the decarbonization ambition from Saint-Gobain but also from Germany and the European Union," said Ariane Weisler, Senior Project Leader Decarbonization of Herzogenrath site (COSIMA Project) – Saint-Gobain.

The COSIMA Project takes a global view and aims at decarbonizing the whole site of Herzogenrath by 2030, including the Sekurit plant with the Research and Development centre. All three entities work hand in hand to strengthen the synergies between the production of flat glass and the transformation of the glass products into performing glazings for the automotive industry.

FGC GROUP ACQUIRES ASSETS OF NSG GROUP IN RUSSIA

The FGC Group announced completion of the acquisition of the Russian assets of NSG Group, including the Pilkington Glass Russia plant and STiS Group. The details of the deal were not disclosed by the parties.



Pilkington Glass Russia was represented by a glass factory in Ramenskoye, Moscow Region, with a nominal production capacity of 800 tonnes of glass per day.



The STiS group of companies includes 8 production sites for the manufacture of double-glazed windows and specialized glass products – in Serpukhov, Vladimir, Saratov, Naberezhnye Chelny, Krasnodar, Stavropol, Voronezh and St Petersburg.

FGC Group is increasing its assets in the glass industry. In 2022, the company became the new owner of the glass businesses formerly owned by Guardian Industries. Since September they have been working under the new Larta Glass brand.

After the purchase of the Russian assets of NSG Corporation, the portfolio of FGC Group of Companies will include 3 flat glass plants and 8 glass processing plants. The Pilkington Glass plant will operate under the Larta Glass brand and STiS Group will continue to develop in the market for the production of double-glazed windows under the current brand.

“The perimeter of the FGC group of companies includes high-tech enterprises, including Larta Glass plants,” said Vladimir Voronin, President of FGC Group of Companies. “With the acquisition of the assets of Pilkington Glass,



we are strengthening our expertise and expanding our share of the glass market. In addition, the new assets will allow us to significantly increase productivity and diversify the range of glass products.”

GUARDIAN GLASS INTRODUCES NEW FEATURE TO PERFORMANCE CALCULATOR TOOL

Guardian Glass introduced a new feature to its Performance Calculator tool. The feature allows users to calculate the embodied carbon for the glazing configurations they select. This means architects, specifiers and glass processors can better understand the environmental im-

pact profile of the façades they design through the glass products they specify, allowing them to make more informed choices at a very early design stage.

The current Guardian Glass Performance Calculator is an online tool for modelling the thermal and optical properties of glass substrates, coatings and interlayers. The existing tool is part of Glass Analytics, a comprehensive suite of engineering and analytical tools from Guardian Glass that help demonstrate the benefits of high-performance glass in building façades.

The new Performance Calculator feature provides an estimate of the embodied CO₂ equivalent for a wide number of glazing combinations, as it is available for any float glass, coated glass, laminated and coated laminated glass products produced by Guardian Glass in Europe.

Using the Performance Calculator, the user configures a suitable glazing make-up for their project and can view the corresponding performance data. The glazing can be virtually any construction, ranging from monolithic glass to multiple layers of glass,



coatings and interlayers. In addition to the extensive performance properties generated by the Performance Calculator, the new feature provides an estimate of the embodied CO₂ eq. for the configured glazing (only for the glass components manufactured by Guardian Glass, not for additional components in the build-up such as spacers or frame). Multiple glass configurations and options can be compared, allowing the user to better understand the impact of, for example, additional layers of glass or the incorporation of a high-performance coating or laminated layers (where the data is available).

The embodied carbon data is the CO₂ equivalent in kilograms per square metre of glass (CO₂ eq.), emitted during the glass production (Cradle-to-gate). The calculation is an estimation based on the material’s Embodied Carbon Factor (ECF) derived from the Regional Environmental Product Declaration (EPD), a third-party, independently verified document that communicates transparent information about the lifecycle environmental impacts of a product.

HALIO AND GLASSBEL: PARTNERSHIP FOR SMART GLASS SOLUTIONS

Lithuanian glass processor GLASSBEL BALTIC integrated HALIO interlayer into its product portfolio. GLASSBEL and HALIO customers will be able to purchase HALIO’s switchable insulating glass units (HALIO Smart Glass) fabricated by GLASSBEL in Europe.



With more than 10,000 projects in 30 countries, including the renovated art deco tower One Wall Street, the Dubai Opera House and the London headquarters of Foster and Partners, GLASSBEL is one



of the world's leading premium architectural glass manufacturers with various glass coatings and configurations. "With the HALIO system, we have chosen the most advanced and sustainable smart glass technology. We can now respond to our customers' increasing demand for switchable facades with an aesthetically and functionally compelling product," said Dmitri Sobolevski, CEO of GLASSBEL.

The heart of the latest generation HALIO system is the 1.2 millimetre thick HALIO interlayer, which is installed into laminated safety glass packages. Due to the pioneering sandwich construction, the glass is hermetically sealed with the conductive layers.

"Since the glass structure is not predefined, certified HALIO partners such as GLASSBEL have considerably more options for tailoring the insulating glass units to individual customer requirements, for example with regard to sound insulation or thermal insulation," explained Robert Jagger, Senior Manager Europe at HALIO. "Working with a European partner also shortens delivery routes and delivery times for HALIO insulating glass units."

With this move, HALIO, Inc. broke new ground for marketing its latest generation of products in Europe and the Middle East.

"GLASSBEL is incredibly broad-based. We are delighted that the team will be able to combine its lamination and insulating glass expertise with the electro-chromic HALIO interlayer and open up new business areas in its core markets," said HALIO CEO Bruce Sohn. "In the future, there will be no way around smart glazing, particularly in the area of architectural facades, which can adjust its light transmission level in real-time to the light and weather conditions. But HALIO is also an elegant and convenient solution for energy-efficient passive houses as well as low and zero-energy buildings in the residential sector."

The cloud-based system comes complete with hardware components and software for control and has – uniquely to HALIO – integrated a 180 degree High-Definition Sky Camera with illuminance sensor. HALIO is particularly proud of the aesthetic quality of the tinting. With a colour rendering index of 97 percent for double glazing, the glazing is completely colour-neutral and indistinguishable from conventional low-e glass when clear. Transitions through elegant, cool greys typically take less than 30 seconds.

SANCO GROUP EXPANDS: UNIGLASS POLSKA JOINS AS NEW PARTNER COMPANY

The SANCO Group announced a new member company, as UniGlass Polska joined the alliance June 2023,



adding another manufacturer from Poland. With over 60 insulating glass producers from 14 countries, SANCO strengthened its position as the largest group of its kind in Europe.

UniGlass Polska is a family-owned business located in Lomza, approximately 150 kilometres north-east of Warsaw. The company has been active in the market for over 23 years and offers a comprehensive range of products for façade and interior applications. Their high-quality products are sold throughout Poland and neighbouring countries, and the company employs around 200 people. "Being part of the SANCO Group is a significant gain for us," said Radosław Florczyk, owner and CEO of UniGlass Polska. SANCO provides targeted support in daily practices, such as certifications, test certificates, and marketing activities. Moreover, being part of a group with international reach is of great value to UniGlass Polska.

"The opportunity to share expertise with other members of the SANCO Group, both in Poland and abroad, is highly important to us."

Antonio Gioello, Head of SANCO Consulting, added, "We are delighted to welcome a new addition to the SANCO family. UniGlass has demonstrated dynamic growth and excellent product quality over the years, making it a perfect fit for SANCO."

In the fiercely competitive Polish market, the role of an alliance like SANCO holds great value, especially since there is no comparable organisation there. In addition to UniGlass, seven other medium-sized insulating glass manufacturers from Poland are part of the SANCO Group.

PILKINGTON UK LAUNCHES HIGH PERFORMANCE ANTI-REFLECTIVE GLASS

Pilkington OptiView™ Ultra, a highly transparent anti-reflective glass from NSG Group, launched in the UK to support architects specifying for the retail and leisure sectors.

The high performance anti-reflective glass can reduce visible light reflectance to less than 1 percent, compared to 8 percent typically provided by standard glass. The neutral colour of the coating provides a more natural view through the glass, improving clarity and preserving the true colours of the viewed area.

The glass is ideal for high light environments where visibility is crucial, including retail display, and entertainment and cultural venues. It's also suitable for technical appli-

cations, such as digital signage and touch screens.

Pilkington OptiView™ Ultra is highly robust, making it easy to process and work with. It can also be laminated and toughened making it suitable for internal and external use for a variety of demanding applications.

The product has proven to retain the intended true colour when printed or painted, and can also be bent, allowing the glass elements of a project to match the intended aesthetics.

Craig Bain, VA Sales Manager at Pilkington United Kingdom Limited, part of the NSG Group, said, “The product delivers excellent aesthetics and a superior level of clarity and vision through the glass, while retaining the durability and processability found across the Pilkington OptiView™ range. There are numerous sectors and applications that can benefit from using the glass, from retail to residential, and we’re excited to help customers take advantage of its unique properties to meet their design challenges.”

The glass is now widely available in the UK in various thicknesses from 4 to 10 millimetres, both single and double coated. The product is stocked in St Helens and is available for distribution directly to customers or through the Pilkington UK branch network.



VITRO ARCHITECTURAL GLASS LENDS HIGH-TECH LOOK TO UNIVERSITY OF TEXAS

In creating a building befitting of the cutting-edge, high-tech research and cyber security programs taking place at the University of Texas at San Antonio (UTSA) National Security Collaboration Center, a combination of red brick, limestone masonry, metal and high-performance glass were selected for the modern façade.

The mix of materials helps the building fit within the historic context of downtown San Antonio with Solarban® 70 glass from Vitro Architectural Glass enhancing indoor-outdoor connections.

“We have utilized Solarban® 70 glass on numerous projects and it has been a time-tested solution,” said Adam Bush, AIA, president, Overland Partners, San Antonio,



Solarban® 70 glass, red brick, limestone masonry and metal display a high-tech facade at the University of Texas at San Antonio (UTSA) National Security Collaboration Center -
Photography: Tom Kessler

Texas. “For this project, it was determined to be a high-value option as we weighed requirements for building performance, aesthetic criteria and overall cost.”

Solarban® 70 glass is the most commonly specified triple-silver-coated low-e glass in the industry. With its transparent, colour-neutral aesthetic and unprecedented solar control and visible light transmittance (VLT), Solarban® 70 glass offers the perfect balance between form and function. When coupled with conventional clear glass in a one-inch insulating glass unit (IGU), Solarban® 70 glass provides a solar heat gain coefficient (SHGC) of 0.27 and VLT of 64 percent.

As the new home for the School of Data Science, the building houses its cybersecurity, cloud computing, data and analytics and artificial intelligence programs in addition to the National Security Collaboration Center (NCSS)—ranked as the number one cybersecurity program in the nation by the Ponemon Institute.

Supporting a range of public spaces and the quiet and intimate settings required of a security institution, the Overland Partners designed the building with curtain wall and punched window openings based on programmatic needs and the sun’s orientation.

The windows range between 2 by 8 feet, 8 inches and 4 by 8 feet, 8 inches, and were calibrated to minimize heat gain and glare. For enhanced daylight, glare control and privacy, a combination of motorized and manual roller shades were installed throughout the façade.



Color-changing LEDs draw attention to the UTSA logo serving as a marquee for cybersecurity and other data science related programs taking place inside
Photography: Tom Kessler

August 2023

GUARDIAN GLASS' SUNGUARD SUPERNEUTRAL SNR 35 COATED GLASS WINS AWARD

SunGuard SuperNeutral™ SNR 35 coated glass by Guardian Glass North America was the 2023 Best Glass or Glass Component as voted by the readers of NGA’s Glass Magazine.

“This year’s Glass Magazine Award winners demonstrate the amazing multifunctional capabilities of glass,” said Katy Devlin, Content Director and Editor-in-Chief of Glass Magazine. “The winners show how glass and glazing are used to meet sustainability and performance requirements, to create spaces that provide safe and healthy environments for occupants, and to achieve unparalleled feats of design and aesthetics.”



SNR 35 combines those features and benefits via a classical, neutral silver aesthetic both at normal and angular incidence and excellent energy performance led by a low solar heat gain coefficient of 0.17 on clear glass to present the attractive exteriors architects seek while helping to provide bright, comfortable interiors.



“The glass community have responded very positively to the SunGuard SuperNeutral SNR products – SNR 50 coated glass was Glass Magazine’s 2022 Best Glass or Glass Component,” said Darijo Babic, Architectural Sales Director at Guardian Glass North America. “We’re honoured to be recognized by Glass Magazine and its audience for products that help serve our customers’ needs.”

IDEYE® BY AGC TO SHOWCASE UNIQUE ADAS 360° SENSOR INTEGRATION

Wideye, the AGC Group scale-up specialising in sensor integration solutions for self-driving vehicles, was at IAA Mobility, in Munich, Germany, from September 5 to 8, 2023, where it showcased glass innovations for the efficient, reliable and aesthetic integration of optical sensors for ADAS and Autonomous Driving applications.



The industry’s interest in mounting sensors at multiple locations on the vehicle continues to grow as the market increasingly focuses on ensuring safety for drivers while accelerating the race towards autonomy and self-driving cars. In this context, 360° detection coverage is critically important and different mounting architectures are being developed.

Wideye’s concept car is fitted with five prototypes, proving its ability to address the challenges of mounting sensors around the vehicle. In so doing, Wideye demonstrates how the scale-up is leveraging its momentum and how its glass solutions are the perfect fit for higher levels of autonomous driving.

Wideye is backed by AGC Automotive Europe, AGC Group’s European automotive glass branch, which specialises in the production of glazing solutions for car makers. Since its launch in 2016, Wideye has focused on enabling ADAS deployment and making fully autonomous vehicles a reality. Through comprehensive R&D and partnerships with sensor companies, Wideye has developed the know-how to deliver 360° sensor integration from the early development

stage up through mass production and is focusing its innovative services and products on sensor suppliers, Tier 1 automotive suppliers and OEMs by working in close collaboration with them.

NTGLASS: THE SOLUTION

Nashville Tempered Glass (NTGlass) is part of the solution to a silent crisis: up to 1 billion bird fatalities each year in the U.S. due to glass collisions. Birds struggle to differentiate real landscapes from those reflected in windows, leading to fatal impacts. But NTGlass is changing that narrative with its Surface 1 laser-etched, bird-friendly glass.



Birds and Glass: The facts

- Birds can’t recognize glass as a solid, leading to high-speed collisions that are often fatal due to their lightweight, fragile structure.
- Unlike humans who learn to detect glass through cues like window frames and door handles, these cues are non-existent for birds, making glass virtually invisible to them.
- The danger to birds is ever-present, with peaks during spring and fall migrations but remaining high near bird feeders and baths year-round.
- Most collisions occur during the day at home windows and low-rise buildings. Skyscrapers only account for 0.1 percent of all collisions, but every building has a role to play.

NTGlass: The solution

- NTGlass’ Surface 1 laser-etched treatment creates highly visible patterns that dramatically reduce bird collisions, amplifying avian safety without compromising aesthetics.
 - NTGlass’ solution caters to project-specific needs with tailored glass sizes and designs.
 - NTGlass offers operational flexibility, managing orders from single pieces to large-scale production runs.
- Join NTGlass in making a safer world for our feathered friends with their innovative bird-friendly glass. Let’s reduce bird collisions one building at a time.

PILKINGTON USA: ROSSFORD, OH - BUILT BY GLASS PIONEER EDWARD FORD

From its beginnings in 1898 when Edward Ford created a new “company town” focused on glass making to today, Rossford, Ohio, USA, has been known as a community that families and businesses have proudly called home. From Libbey-Owens-Ford to Pilkington to NSG Group today. A host of events took place for the culmination of the 2023 celebration of Rossford’s 125th Anniversary and NSG Group was proud to be a sponsor for such a momentous oc-

casian. The events blended live music, arts, food, kid's events, fireworks and hospitality to celebrate the historic milestone.



The afternoon of Friday, July 28, featured tours of Pilkington's Rossford plant and the participants were thrilled and thankful for the opportunity to peek inside the big plant. That night was the official



grand opening at the Rossford High School and Saturday's events included the 125th Anniversary Parade in the morning and concluded with a very special 125th Anniversary Riverfest Celebration that evening.

David Imbrogno, Rossford Plant Manager, said, "Being part of 125 years of Rossford history is humbling. We have met many retirees throughout the anniversary celebrations and with each discussion, there is a tremendous amount of pride and passion. We appreciate knowing we are here because of the hard work of those that have come before us. What an amazing history that we get to be a part of."

GUARDIAN GLASS™ INTRODUCES CLIMAGUARD™ 55 RESIDENTIAL GLASS

Guardian Glass™ North America has launched ClimaGuard™ 55 coated glass, offering a best-in-class solar heat gain coefficient for the mid-VLT category product (as of this publication) to help residential window manufacturers meet increasingly stringent energy standards with industry-leading performance.



Designed for ENERGY STAR® Version 7.0 compliance in the Southern, South-Central and North-Central zones of the United States, ClimaGuard 55 coating is a double-silver product with triple silver performance. It provides a visible light transmission of 55 percent, a U-Value of 0.243 to support thermal insulation and a best-in-class solar heat gain coefficient of 0.258.

ClimaGuard 55 will give home-owners in warm climates a subtle, neutral aesthetic while helping to block solar heat and glare without darkening the room, helping to create bright, inviting interiors and clear views. Combining CG 55 with Guardian ClimaGuard IS 20 interior surface coating will further enhance performance by further reducing solar heat gain and U-Value.

"Because ClimaGuard 55 will help keep home-owners

ahead of the latest sustainability standards, it will bring value for years to come," said Darlene Aldred, Residential Segment Marketing Manager, Guardian Glass Americas.

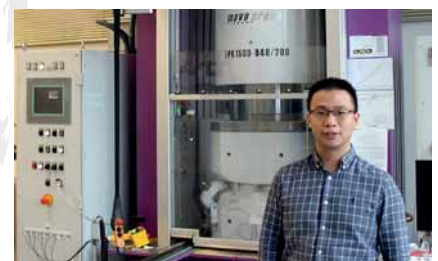
"ClimaGuard 55 is the newest edition to the ClimaGuard suite of products designed to help customers meet ENERGY Star Version 7.0 and other codes that drive energy conservation in residential buildings," added Suresh Devisetti, Director of Product Management, Guardian Glass Americas. "This launch is a good example of creative destruction in action where trading good product for better performing product to pro-actively deliver a next gen product with notable improvements to solar heat gain and thermal performance."

ClimaGuard 55 specifications

- Standard IGU Configuration: Surface #2
- Triple-pane IGU: Surface #2 and/or #5
- Sizes: 72 by 84 inch, 72 by 96 inch, 96 by 130 inch and 96 by 144 inch
- Thickness: 2.3 to 5 millimetres
- Can be heat-treated and tempered for safety and thermal stress resistance
- Guardian Glass experts can support manufacturers and builders using this glass to meet new codes with little to no modification of window designs.

UNIVERSITY OF BAYREUTH: NEW GLASS WITH SUPREME TOUGHNESS

Researchers at the University of Bayreuth, together with partners in China and the USA, have produced an oxide glass with unprecedented toughness. Under high pressures and temperatures, they succeeded in paracrystallizing an aluminosilicate glass: The resulting crystal-like structures cause the glass to withstand very high stresses and are retained under ambient conditions.



Dr. Hu Tang, first author of the study, in front of a high-pressure press at the Bavarian Research Institute of Experimental Geochemistry and Geophysics (BGI) - © UBT / Chr. Wiffler

Paracrystallization thus proves to be a promising process for producing extremely break-resistant glasses. In "Nature Materials," the researchers present their findings, in which the German Electron Synchrotron (DESY) in Hamburg also participated.



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DAILY NEWS



September 2023

SAINT-GOBAIN DIVESTS ITS GLASS PROCESSING BUSINESS IN SLOVAKIA

Saint-Gobain completed the sale of its glass processing business Glassolutions in Slovakia, to "Glasora a.s."



The Business, with its industrial plant located in Nitra-Chrenová, generated sales of around EUR 20 million in 2022 and employs 150 people.

This transaction is part of Saint-Gobain's continued business profile optimization strategy, in line with the "Grow & Impact" strategic plan.

MILAN, WORLD CAPITAL OF GLASS

Milan, the capital of glass: this was the aim of VITRUM and Vision Milan Glass Week, two international events promoted by GIMAV, an association part of Confindustria, which brings together Italian suppliers of machinery, accessories, equipment and special products for glass processing. To this end, for a week the city of Milan was the focus for the international glass industry, supported by events, exhibitions, guided tours, exclusive showroom openings, workshops, meetings and much more.

On Monday September 4 at the press conference in the Sala della Balla at the Castello Sforzesco, over 100 initiatives were presented that will characterize the Vision Milan Glass Week programme and the 23rd edition of VITRUM, the most important trade fair in the glass sector, which brings together companies and operators in the processing of hollow and flat glass at Fiera Milano Rho from September 5 to 8.

The press conference was introduced by institutional greetings from the Minister of Enterprises and Made in Italy, Adolfo Urso, the Councillor for Culture of the Municipality of Milan, Tommaso Sacchi, the Director of the Industrial Technology, Energy and Environment Office of the ICE Agency, Antonio Lucarelli.



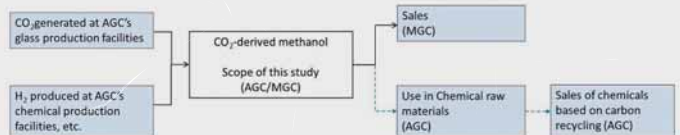
From left to right: Lucia Masutti, General Manager Glass Group; Francesca Tasso Director Area Musei of Castello Sforzesco, Musei Archeologici e Storici; Dino Zandonella Necca, President Gimav and VITRUM; Gianni Scotti, President CoReVe; Gabriella Del Signore, Founder and Managing Director Ghenos Communication; Annoio Lucarelli, Director Ufficio Tecnologia Industriale, Energia e Ambiente - ICE Agency

Vision Milan Glass, from September 4 to 10, aimed to repeat the great success achieved by The Italian Glass Weeks, a special edition created in 2022 – proclaimed the International Year of Glass by the United Nations – which involved more than 450,000 visitors between Milan and Venice.



Likewise, VITRUM 2023 was an event that could not be missed, where the main operators of the sector met, exchanged ideas, discussed trends and tendencies and created innovations for the "glass of the future."

AGC: STUDY ON CIRCULAR CARBON METHANOL FROM CO2 FROM GLASS PRODUCTION



AGC Inc. and Mitsubishi Gas Chemical Company, Inc. (MGC) began a study regarding the production and sale of methanol made from CO₂ generated from AGC's architectural glass production, by applying the methanol production technology developed by MGC. This study targets commercialization by around 2030 at AGC's Kashima Plant, Japan, and when achieved, it will be the world's first case of producing and selling "Circular Carbon Methanol" (CCM – methanol made from captured CO₂, hydrogen derived from renewable energy sources, or gasified recycled materials, as part of MGC's CCM concept) that effectively utilizes the CO₂ generated from glass production.

In recent years, CCU (Carbon dioxide Capture and Utilization) technology, which captures and utilizes CO₂, has been attracting attention as an innovative technology for achieving carbon neutrality by 2050. Methanol also has a wide range of applications as an essential chemical, and in recent years, its use for conversion to ethylene and propylene has been expanding. As such, it is expected that its utilization will widen the possibility towards carbon neutrality.

The goal of this study is to convert the CO₂ into methanol, which will then be produced and sold. In addition to this study, AGC is also considering replacing methane gas used as a raw material in its own chemical business with CCM, with a view to commercializing chemical products based on carbon recycling.

CORNING TO EXPAND ADVANCED MANUFACTURING CAPABILITIES IN KOREA

Since the early 1970s, Corning Incorporated has collaborated with its Korean customers to propel display and cover glass technologies forward, making possible advancements like LCD and OLED televisions, monitors, laptops, tablets and mobile phones.



In 2023 the company made plans to deepen its commitment to the region, and over the next five years will continue investing in developing advanced materials and expanding manufacturing capabilities. For example, Corning Precision Materials in Asan, Korea, recently established a next-generation production line and the world's first fully integrated supply chain for ultra-thin bendable glass.

"Our latest innovations will enable advanced mobile device designs and automotive displays, making Korea a hub for ultra-thin bendable glass manufacturing," said Wendell P. Weeks, Corning's chairman and chief executive officer. "Korea's commitment to high-tech growth, talented people and supportive government have accelerated Corning's collaboration with our valued Korean customers and partners like Samsung."

Corning's investments in Korea align with emerging market trends, including: next-generation consumer electronics and semiconductors; high-speed connectivity and wireless networks; cleaner, safer and more connected vehicles; and the world's most comprehensive line of life-saving drug discovery and delivery tools for biotechnology research.

"Corning will continue to thrive thanks to our more than 3,000 talented and dedicated employees in Korea, our forward-thinking partners and our local supporters in communities where we operate," said Weeks. "Working together, I am confident that our greatest contributions lie ahead."

GUARDIAN GLASS: BASCHARAGE PLANT'S FURNACE TO RESTART IN Q4 2023

Following a successful cold tank repair, the new furnace at the Guardian Glass Bascharage, Luxembourg, plant was on schedule to be operational in Q4 2023. The innovative furnace marked an exciting new era, as it will be the most energy efficient Guardian Glass furnace.

Enhancements to the Bascharage plant include:

- Once put into operation, the furnace is expected to be around 25 percent more energy efficient.
- The furnace will also provide extra capacity for the plant

to be able to produce both Guardian ExtraClear™ float glass and Guardian UltraClear™ low-iron float glass.

- The installation of a transferred laminated glass line is also expected to be completed in Q4 2023.

Guus Boekhoudt, Guardian Glass Executive Vice President, said, "We invested in the latest melting technology to provide our customers with the most advanced glass products, while using fewer resources."

The Bascharage plant already hosted a coater that produces Guardian ClimaGuard™ low-emissivity (low-E) and Guardian SunGuard™ high performance coated solar control glass for residential and commercial applications.

As Boekhoudt added, "Having all these assets consolidated on one site in Luxembourg, close to many of our key customers, will improve our service offering and underlines our long-term commitment to them and the glass industry."

Bernard Gheysen, Guardian Glass Bascharage Plant Manager, commented, "I am very proud of the team here – everyone has gone the extra mile on this project. We are excited about the new opportunities it opens, as well as grateful for the strong support we have received from the Luxembourg authorities."



The Guardian Glass vision is to improve lives by providing glass products and services people value and to do so responsibly while consuming fewer resources, minimizing waste, and constantly innovating to improve its manufacturing processes and performance – benefiting customers, employees, investors, communities and society as a whole.

PRESS GLASS INVESTS USD 155 MILLION TO EXPAND PLANT IN RIDGEWAY, USA

Press Glass invested USD 155.2 million to expand the Ridgeway plant in Henry County, VA, USA. The company will construct a 34,000 square metre addition to its existing facility.

"With this expansion, Press Glass will make the largest single capital investment by a business in Henry County's history," said the Governor of Virginia, Glenn Youngkin. "The addition of 335 new jobs, more than doubling the company's head count, helps this region continue its economic rebound and demonstrates the resurgence of manufacturing that is happening across the Commonwealth."

The expansion of the production facility is important milestone for Press Glass, Inc. in strengthening its position in the US as a manufacturer of glass for the commercial construction industry.

"Our clients have trusted us and recognized the high quality of Press Glass products, so the expansion of the factory



in Ridgeway is a natural step to increase the availability of our offerings and strengthen our position in the American market," said Maciej Migalski, President of Press Glass Inc. "After the expansion, the Ridgeway plant will be one of the largest and most automated facilities processing architectural glass in the USA. At the same time, we will create new, valuable job opportunities. We express our gratitude to the local leadership for their invaluable support."

The Virginia Economic Development Partnership worked with the Martinsville-Henry County Economic Development Corporation to secure the project for Virginia. Governor Youngkin approved a USD 2 million grant from the Commonwealth's Opportunity Fund to assist Henry County with the project. Funding and services to support the company's employee training activities will be provided through the Virginia Jobs Investment Program.

AGC'S DIGITAL CURTAIN™ LIGHT CONTROL GLASS ADOPTED BY TOYOTA

AGC announced that its Digital Curtain™ light control glass for automotive applications has been adopted for Toyota's "Century" model, which launched in 2023.



Century, a new model to be released by Toyota in 2023



The adoption of Digital Curtain™ in the rear seats allows for instantaneous control of light transmission and visibility, thus contributing to a spacious and comfortable cabin interior.

This is the first time in the world light control glass is adopted for car door sections.

Digital Curtain™ is a light control glass that reduces the heat and glare of the sunlight and ensures privacy in the dimmed mode (opaque state), while delivering a sense of openness in the transmissive mode (clear state).

Until now, light control glass has been used in fixed windows, such as panoramic roofs. The new Digital Curtain™ has achieved not only chemical durability to withstand long-term exposure to wind, rain and sunlight, but also mechanical durability for opening, closing, raising and lowering.

Additionally, the black ceramic design around the window glass was made as thin and neat as possible, which was highly evaluated as a door design befitting the prestige of the Century and led to the world's first use of light control glass in the rear door section.

The Digital Curtain™ eliminates the need for shades and provides a larger, more advanced and comfortable rear seating space, as well as increased privacy.

Digital Curtain™ light control glass consists of laminated

glass with a special film sandwiched between two sheets of glass, which contains a special material so small that it is invisible to the eye.

Digital Curtain™ reduces UV rays by approximately 99 percent in both dimmed and transmissive modes.

SEDAK TEMPERED+: TOUGHENED GLASS WITHOUT ANISOTROPIES

sedak celebrated a spectacular launch of the first tempered glass without anisotropies - invisible to the naked eye: sedak tempered+.



Engineered to deliver fully-tempered and heat-strengthened glass with no anisotropies and best optical properties, tempered+ goes beyond the ordinary to set new standards in glass. Enjoy thermally toughened glass with a pattern-free vision from every angle and under any lighting condition. sedak's advanced tempering technology makes it possible.

sedak tempered+ represents a new generation of toughened glass, where visual and mechanical properties are consistent from any angle. It's the promise of a harmonious relationship between architecture and glass, where aesthetics and functionality coexist seamlessly. sedak tempered+ signifies more than a product; it's a leap forward in glass technology to celebrate the transparency of one of the most favourite materials in architecture.

sedak's advanced tempering process set new standards in glass. Through cutting-edge manufacturing techniques, sedak tempered+ achieves a homogeneous structure, rendering it not only highly resistant to impacts and extreme temperatures, but also offers remarkable clarity and vision. Like common tempered glass, sedak tempered+ is produced by heating the glass to a high temperature, usually around 620 degrees Celsius (1,184 degrees Fahrenheit), and then rapidly cooling it using air jets. By balancing heating and cooling, sedak's patented tempering technology reduces the stress differences in the glass. It does not create any anisotropies.

Glass is actually optically isotropic and light is transmitted uniformly. Through thermal toughening, the incoming light refracts in different ways: glass becomes anisotropic. The eye recognizes



Due to a patented production process sedak tempered+ is the first tempered glass with no anisotropies - ©sedak

es this as a shimmering in the glass (interference colour). These effects, such as rainbow-like spots or grey stripes in daylight, occur in previous tempering processes.

GLASS BY VITRO ARCHITECTURAL GLASS FEATURED IN AWARD-WINNING PROJECTS

Vitro Architectural Glass has announced that six of the ten buildings selected by the American Institute of Architects (AIA) Committee on the Environment (COTE) as the top sustainable design projects of 2023 don their Solarban® high-performance solar control low-e glass.

Now in its 28th year, the COTE Top Ten Awards has become

the industry's best-known awards program, recognizing innovative projects integrating exemplary performance with compelling design.

"Vitro's low-e glass being featured in six of the top-10 green building projects of 2023 is a proud moment for us and is a testament to our commitment to providing the most sustainable solutions for building owners," said Ricardo Maiz, President, Vitro Architectural Glass. "I'd also like to commend our architectural and account managers in these regions. Their hard work and dedication to connecting architects, glass fabricators and glaziers with the best-performing products for their projects is why we're able to celebrate these honours."

- Casa Adelante 2060 Folsom (San Francisco, California)
- DPR Sacramento Zero Net Energy Office (Sacramento, California)
- RIDC Mill 19: Buildings A & B (Pittsburgh, Pennsylvania)
- Watershed (Seattle, Washington)
- Science and Environmental Center (Hillsborough, California)
- North Torrey Pines Living & Learning Neighborhood (San Diego, California)

Four award-winning buildings feature Solarban® 60 glass, which provides year-round comfort for occupants with heating and cooling cost savings.

ŞİŞECAM IGNITES ITS NEW AUTOMOTIVE GLASS FURNACE IN LÜLEBURGAZ

In pursuing continuous growth with the aim of creating sustainable value for all its stakeholders, Şişecam opened a new automotive glass line worth about TRY 4 billion (USD 190 million) with additional capital investments at its facility in Luleburgaz, Kirklareli, Turkey. The



COTE award-winning project, Watershed - Photo credit: Built Work Photography, LLC

new line will operate at an annual capacity of 200,000 tonnes and create an additional 114 jobs.

Dr Ahmet Kirman, Şişecam's Chairman and Executive Member of the Board, commented on Şişecam's investment in the field of automotive raw glass, saying, "In 2021, we had announced our decision to invest in a flat glass line in Luleburgaz because of the increasing global competition and the growing demand for automotive glass reaching significant levels in Turkey. Now, we are proudly bringing it to life. The new line will feature high efficiency production with a net width of 4.88 metres, well above the industry standards. Thanks to this investment, Şişecam's float lines, which currently produce automotive glass, will be devoted entirely to architectural glass by expanding their capacity and boosting their efficiency."

He continued by stating that a significant portion of thin and ultra-thin clear colourless and coloured float glass needs of Şişecam's automotive glass production facilities will be met by the new float line.



"In addition to this investment, construction is under way at Şişecam's TR9 float line in Tarsus - one of the world's top five largest capacity flat glass investments. The cold repair and capacity expansion of the TR1 float line in Luleburgaz is also ongoing. Once these two investments are completed, Şişecam's total float production capacity in Turkey will increase by 30 percent and reach 2.6 million tonnes."

Şişecam's Luleburgaz facility was the first production facility equipped with advanced float technology in Eastern Europe, the Balkan region, Middle East and North Africa. The facility has been operating since 1981. Two furnaces operate at the facility to produce flat glass, mirrors and automotive glass. Şişecam produces automotive glass in Russia, Hungary, Slovakia, Germany, Bulgaria and Romania.

AGC GLASS EUROPE: LUXCLEAR, ANTI-CORROSION COATED GLASS

With its invisible anti-corrosion coating, Luxclear from AGC Glass Europe is the ideal solution for shower screens and can also be effectively deployed in outdoor applications, such as balustrades and conservatories.

Leveraging the durable protection provided by its coating, its surface does not suffer from corrosion, which means there is no clouding or the stained look that typically occurs as a result of long-term exposure to moist or humid environments.



Luxclear is also easier to clean and maintain since lime-scale deposits and soap residue are a thing of the past. Now that AGC applies the Luxclear coating in an offline magnetron process by physical vapour deposition (PVD), customers have more substrate options: Luxclear is now available on super transparent low-iron Clearvision glass as well as on Linea Azzurra, delivering a special touch with its elegant bluish edge.



Since Luxclear is especially resistant to chemical corrosion (class A under EN1096-2), it preserves the original aesthetics of the glass by limiting the corrosive process and surface degradation. Simply rinsing with clear water is sufficient to clean the glass, enabling environmentally friendly and cost-effective maintenance.

Luxclear can be processed and tempered with parameters similar to float glass of the same thickness. It can be cut into straight, circular or curved shapes, and edge grinding, drilling and notching are also routine. Special treatments, such as laminating or finishing with printing, are also possible. After final toughening at the processing plant, the end product is a robust single-pane safety glass (ESG) that can be installed directly at the end user's premises.

Luxclear comes with a 10-year warranty.

SAPPHIRE FLOAT GLASS: NEW FLOAT GLASS PLANT IN TANZANIA 90% COMPLETE

The Sapphire Float Glass (Tanzania) Company Limited, owned by a Chinese investor, was responsible for the construction of



a state-of-the-art float glass manufacturing facility in Mkiu Village, Tanzania.

Construction of the project commenced in 2022 and was set to start production in September 2023. The facility signifies an important milestone in the region's industrial landscape and is poised to redefine the glass manufacturing sector in the country.

According to information provided by the company, the production capacity of the facility can meet and exceed the demand for glass in Tanzania and other neighbouring countries in East Africa, which are under the same EAC Customs Union.

ŞİŞECAM INVESTS IN FURNACE RENOVATION IN INDIA

Şişecam continued to pursue global growth with production operations spanning 14 countries on four continents and a sales network of over 150 countries worldwide.



The company renovated its flat glass furnace at its production facility in Halol, India. Modernized with an investment of about USD 56 million, the furnace produces flat glass, mirror and frosted glass with a daily production capacity of 650 tonnes. Thanks to the electric boosting capability and the improved design of the renewed furnace, 15 percent energy saving was expected after the renovation.



Şişecam has been operating in India for over 10 years. In 2013, the company started production operations in the country by purchasing a 50 percent stake in HNG Float Glass India. In 2018, Şişecam further strengthened its position by purchasing the remaining 50 percent stake in the company. Today, the facility continues its operations under the name of Şişecam Flat Glass India. After almost 4 months of cold repair, Şişecam is now ready to produce approximately 200,000 tonnes annually of flat glass, mirrors, and frosted glass at its renewed furnace.

Şişecam has invested USD 203 million in India and to date employs 264 people in its Halol facility. The company exports from its Halol plant to many countries, including Sri Lanka, Qatar, Nepal, Maldives, the USA, Australia, New Zealand, the Philippines and Brazil. Şişecam aims to further strengthen its position in the global glass industry by combining its production capabilities in India with an innovative approach and advanced technologies.

SKC TO INVEST USD 70 MILLION IN SMART GLASS SOLUTIONS PROVIDER HALIO

South Korean company SKC has decided to invest USD 70 million in California-based provider of electrochromic smart glass solutions Halio, to strengthen its environmentally friendly materials business.

After a board meeting, the company finalized the agenda. Details have not yet been disclosed.

Halio's smart glass is one of the world's most advanced

natural light management systems. Designed to create comfortable and healthy indoor environments by eliminating glare and blocking solar heat, Halio windows deliver numerous ongoing benefits to building developers, owners and occupants.



AXPO AND PILKINGTON AUTOMOTIVE SIGN LONG-TERM PPA

Axpo and Pilkington Automotive Finland Oy, part of the NSG Group, a leading global innovator in glass manufacturing, signed a long-term wind energy power purchase agreement (PPA). The partnership marked a significant step towards powering NSG Group's plants in Finland with clean electricity and further demonstrates the commitment of both companies to sustainability. Axpo will supply Pilkington Automotive Finland's two manufacturing plants with an annual total of 35 GWh of wind-generated electricity from the Storbacken wind farm, located near the city of Vöyri in Finland, for eight years. This significant infusion of renewable electricity underscored NSG Group's unwavering commitment to reducing the company's carbon footprint and embracing sustainability in its operations.

Axpo Sverige AB Originator, David Eickhoff, said, "This PPA was developed during a time when signing long-term agreements was becoming increasingly difficult. It demonstrates that, even in such a challenging environment, we can successfully help our clients reach their sustainability targets by leveraging Axpo's expertise and knowledge of the market."



Pilkington Automotive Finland Oy Managing Director, Jussi Parkkali, said, "We are delighted to sign this long-term PPA with our partner Axpo Nordic to secure renewable electricity for our facilities in Finland. Securing fixed prices for zero-carbon electricity, especially during a time of such volatility, will support our customers and be a huge step towards our sustainability objectives." Together, the two companies aspire to set an example and accelerate the transition toward cleaner, more sustainable energy sources. NSG Group aims to source the equivalent of at least 50 percent of its electricity (by kilowatt hour) from renewable sources by the end of the 2024 fiscal year. The PPA will contribute not only to this target but the NSG Group's 2030 science-based target of reducing Scope 1, 2 and 3 emissions by 30 percent.

Glass Magazines

1989



Glass-Technology International

GLASS-TECHNOLOGY INTERNATIONAL is the leading international magazine for professionals involved in the flat and bent glass industry, from building to automotive, and from furniture to household appliances. G-TI is useful for those working in float glass plants as well as glass processors/fabricators, glazing contractors, automotive glass installers, window and door manufacturers, glass merchants, wholesalers, etc. With about 100 pages per issue, it is the bi-monthly tool for keeping abreast of new technology, new products, company life and all innovations in the world of flat and bent glass.

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**Section for advertisers,
with presentations of their machinery and
accessories, and technical data sheets**

ALPHABETICAL INDEX

| Companies | Pag | Companies | Pag |
|-----------------------|---------|----------------------------|---------|
| A+W SOFTWARE | 180-181 | ITALMOLE | 246 |
| ADELIO LATTUADA | 182-184 | KERAGLASS | 247 |
| B SOLUTION | 186-187 | LISEC | 248-250 |
| BEST MAKINA | 188-189 | MAPPI INTERNATIONAL | 252-253 |
| BIESSE | 190-195 | MARPOSS | 254-256 |
| BOTTERO | 196-202 | MARVAL | 257 |
| BOVONE | 203-205 | MAZZAROPPI ENGINEERING | 258-261 |
| CMS | 206-212 | MOLE MORESCHI | 262 |
| CUGHER GLASS | 213-217 | NEPTUN | 263-265 |
| DELTAMAX AUTOMAZIONE | 218-219 | OPTRIS | 266-268 |
| EDGETECH EUROPE | 220 | RCN SOLUTIONS | 269 |
| FOREL | 221-225 | ROLLMAC DIVISION OF GEMATA | 270-271 |
| GLASS COMPANY | 226-229 | SATINAL | 272-273 |
| GIARDINA GROUP | 230 | SCHIATTI | 275 |
| GPM AUTOMATION | 231-237 | SCHIAVO | 276-277 |
| HELIOS QUARTZ | 238 | SKILL GLASS | 278-279 |
| HORN GLASS INDUSTRIES | 239 | TALAMONI | 280-281 |
| IMMMES | 240-241 | TEXPACK | 282 |
| ITALCARRELLI | 242-243 | TRIULZI | 283-285 |
| ITALMATIC | 244-245 | TUOMAS | 286 |



A+W SOFTWARE GMBH

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A+W BUSINESS

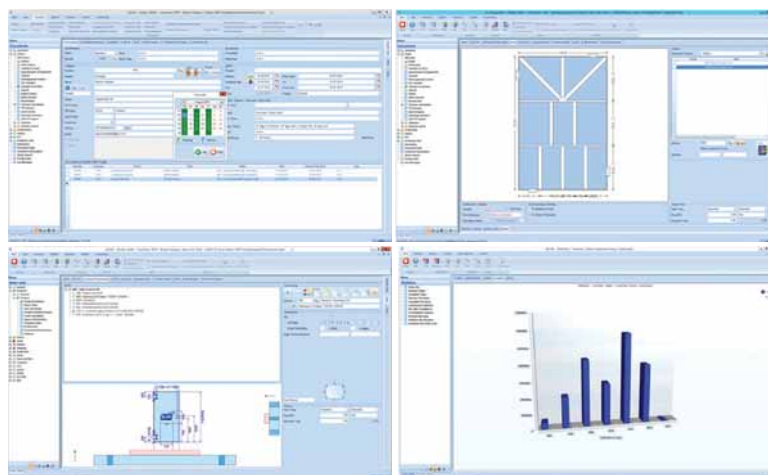
THE PERFECT SOLUTION THAT GROWS WITH YOU

A+W Business is a complete ERP system for small and medium-sized companies in the flat glass industry. The A+W commercial solution allows not just the entry of quotations, orders, credit notes, complaints, delivery notes, and the management of purchase orders and inquiries, but also control of other company areas (e.g. stock, purchasing, dispatch, etc.).

The main functions are master data management, quotation creation, order processing, the creation of partial deliveries and complaints, and all associated documents and evaluations. With its graphic interface, A+W Business is easy and quick to use, and it simplifies all company-internal processes relating to order processing.

FUNCTIONS AND BENEFITS

- Modern look & feel like MS Outlook: multi tasking, multi dialogue, easy usage, everything graphical
- Construction & processing via BOM Concept: every level and part of a product can be processed (processing = article number)
- Easy order handling: copy documents (order -> P.O.), automatic purchasing
- User and/or automated order/P.O. processing: define work flows and user rights, time and cost savings thanks to automation
- Interconnection with A+W Production: transfer of orders & P.O.'s, production status & feedback



- Full integration of CAD Designer (Shapes & Bars): easy Technical Order Entry (TOE)
- Integration of A+W standard shape & standard processing catalogue
- Simple master data replication (in the case of several subsidiaries)

A+W PRODUCTION

EVERYTHING PERFECTLY PLANNED AND OPTIMIZED

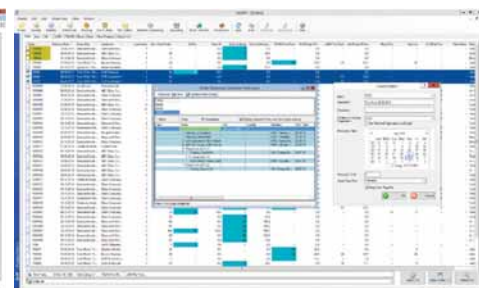
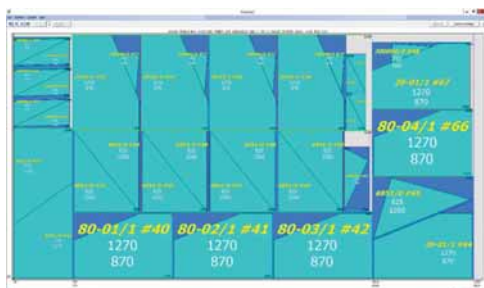
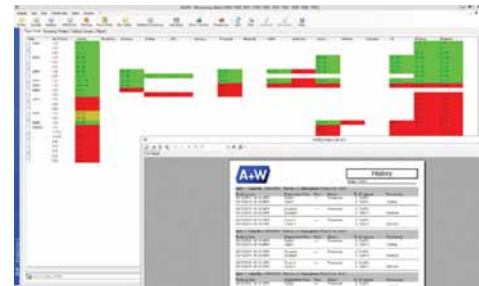
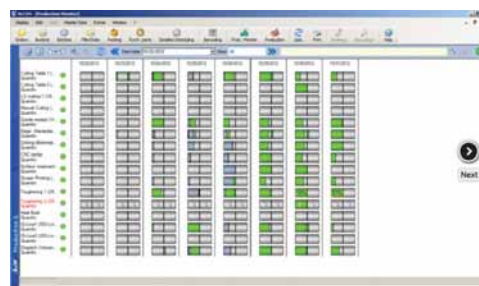
An expanded product line and state-of-the-art machines are placing ever-higher demands on organizational concepts, as well as planning and control software. These machines, which are highly complex and sensitive high-tech systems, enable high cycle rates and thus quick throughput times, but only if the overall concept is right and the production process is optimally planned and controlled. Therefore, scalable software systems and integrated solutions are the key to an optimized production environment.

A+W Production is an extremely flexible PPS solution for complete rough and detailed scheduling for insulated glass, tempered glass, and laminated glass production. The system allows planning and control of even the most demanding multi-level production flows.

The latest improvements within capacity planning and scheduling such as campaign planning, simplified rescheduling possibilities, and improved scheduling algorithms have expanded A+W Production's functions and simplified the daily business of production management and work preparation.

FUNCTIONS AND BENEFITS

- Production planning and control by means of various restrictions (machines, process sequence ...)
- Job management using predefined and self-defined views thanks to open database and views
- Yield optimization by state-of-the-art optimization kernel
- Sequence optimization, rack and stacking organization and optimization
- Optimization directly onto racks and boxes in despatch sequence (Add-On A+W Rack Optimizer)
- Cutting plan visualization and modification
- Easy machinery management and direct machine control
- Efficient and graphical Capacity Planner (Add-On)
- Full integration of barcoding and tracking (Add-On A+W Barcode Manager)
- Always up to date statistics using Crystal Reports or QLIK
- Printout of production papers, bender texts and barcode labels
- Possibility to grow with your company based on add-ons such as Capacity Planner, Barcoding, Production Terminal





A+W IQQUOTE

GLASS ORDERS 24/7

A+W iQuote brings your online shop into the future. Your customers can enter and manage quotations and orders 24/7 and view quotation/order status – even when they're on the road. This not only gives you an additional sales channel, it also provides competitive advantages. It reduces the work involved in recalculating quotations and orders and making changes, for, depending on the status, your customers can make these changes themselves and also enter notes (for example, different delivery address or requested delivery date).

A+W iQuote relies on your ERP system, which means that the data comes directly and online from your database. There are no more delays due to e-mails or telephone calls only to find out that a customer inquired about a product that cannot be built. The products and prices that your customers see online are always up-to-date and you can manage them in your ERP system. A+W iQuote follows the rules of your A+W ERP system, with the same prices, feasibility and plausibility checks that you have defined there. Functions and Benefits

BROWSER-BASED PRODUCT CONFIGURATION

- Online construction and price calculation
- Data directly calculated and saved in A+W ERP
- Products, prices and discounts from your A+W ERP System
- Integrated authorization based on A+W ERP
- Paperwork done by ERP
- Interface for touch screen
- Order history
- Attractive design
- Responsive Design: made for modern and portable devices (tablets)
- Creation of orders and quotes
- Restrictions and prices from ERP for that customer (login)
- Entry of single glass, Lami and IG (including exchange of glasses and spacer), stock sizes and boxes (cases)



A+W SMART COMPANION



SCAN SMARTER WITH SMART DEVICES

Barcode scanners have established themselves as indispensable tools in the flat glass industry. From incoming goods receipt in the warehouse to status registration in production, on through to delivery confirmation; data is recorded via barcode scanning and transmitted to ERP and production systems. However, the industrial scanner as we know it is quickly becoming obsolete. Smart devices, equipped with the A+W Smart Companion app, great computer power, and outstanding algorithms for handling graphics, is taking its place. The A+W Smart Companion assists along the entire value-creation chain and contributes to its digitalization, saving time and money.

With its A+W Smart Companion app, A+W is demonstrating where software development is heading. Scanning via a smart device app is easier than with customary scanners, it offers a multitude of possibilities, and is cheaper too.

FUNCTIONS AND BENEFITS

- Scan, inform, evaluate – securely and efficiently
- Use on mobile, user-friendly devices
- No learning required – familiar hardware that everybody uses every day
- Runs with iOS and Android
- Depending on requirements, can be used on different smart devices
- Scanning of several bar codes in continuous mode
- Easier work for employees – higher productivity





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E-mail: info@adeliolattuada.com - www.adeliolattuada.com

AUTOMATIC MACHINES

All Lattuada edgers can be equipped with **A-WR** and **i-AL** packages to increase machine automation to the top level.

The exclusive A-WR System introduces a completely automatic wheels setting management, which includes:

1. Automatic pre-setting "ZERO" procedure of diamond and resin wheels, without glass in less than one minute
2. Automatic recover of the polishing wheels' wear
3. Automatic positioning for the wheel's replacement
4. Jog increase/decrease of the spindle position (accuracy 0.01 mm)
5. Automatic positioning on setpoint
6. Automatic backlash recovery
7. Automatic spindle cleaning procedure
8. Wheels wear warning
9. Spindle's problems warning
10. Manual unlocking for any situation
11. Motorized adjustable inlet conveyor
12. Digital ammeters and automatic alert system for the polishing wheels wear
13. Automatic detecting and compensating procedure of the inlet conveyor belt wear

Advantages of the Lattuada A-WR system:

- Wheels setting in less than 1 minute, instead of an average 20/30 minutes manual setting.
- Homogeneous wheels setting regardless of the work shift and the operator on the machine.
- Extremely simple to use, no sample glass needed.



- Homogeneous wheels wear and consistent processing quality.
- Increased spindles cleaning thanks to the automatic cleaning function.
- Reduced exit conveyor belt wear or damaging due to an incorrect wheels "zero" setting.
- Early warning on potential maintenance issues.

3. Automatic management of wheels pressure, glass removal and speed according to the thickness
4. Proportional valves for pressure regulation of the polishing spindles
5. Glass length measurement
6. Remote assistance

The main advantages of i-AL are:

- Reduced machine set-up time
- Constant quality and productivity throughout the shift or day, regardless of different operator's skills.
- Early warning on potential maintenance stops.
- Remote management
- More quality, more productivity, less maintenance, less errors... more marginality.

i-AL is a comprehensive pack of mechanical, electronic and software systems especially designed to deliver the maximum possible automation in glass processing and a full integration with your entire production system.

i-AL pack includes:

1. Digital ammeters displayed on the touch-screen panel
2. Motorized glass removal setting with portable push-button panel



TLR 13 AVC

Electronic straight-line edging machine for the processing of flat edges with arris, and with variable angle from 0 up to 45°, polished by liquid cerium oxide.

Read-outs placed on the control panel enable to set adjustments such as glass thickness, working speed, mitre inclination and edge thickness. A centralized lubrication system avoids wheel wear and tear. The conveyor is composed of pads, made of a special material, which are mounted on precision chains. Mechanic glass clamping system. Automatic polishing wheel intervention thanks to PLC-control. Automatic adjustment of the arris wheels when the glass thickness changes. Adjustable inlet conveyor with which glass removal can be adjusted up to 5 mm.

VERTICAL EDGE POLISHERS (PETRA SERIES)

PETRA by Adelio Lattuada: a line of vertical edge polishers dedicated to the processing of stone, ceramic and composite materials.

Thanks to decades of experience in the processing of these types of materials, the PETRA series of machines can perform high precision and quality processing in an extremely simple way: flat edges, mitres up to 45° or 60°, grooves for drips or other uses and alternate arrises for perfect coupling of two angled slabs. All these processes can also be performed on very small strips or pieces.

Available in standard versions from 9 to 13 spindles, with many options and accessories available (including innovative automation solutions and robotic integrations) and with the possibility of including customized features according to customer needs.

PETRA machines are strong, reliable and easy to use, designed to work continuously for many hours a day in continuous cycles. Maintenance is extremely simple and economical, with immediate and customized assistance.



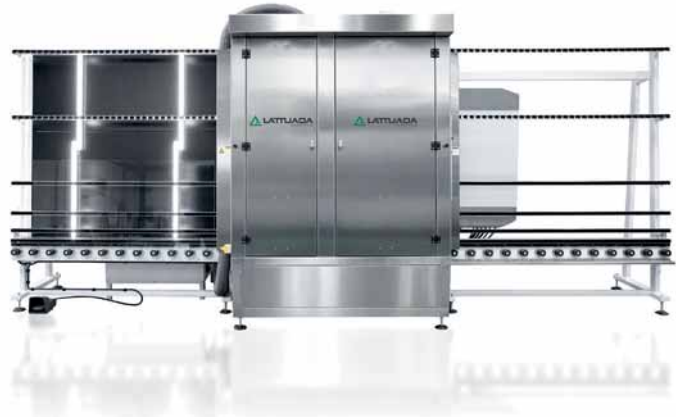
www.adeliolattuada.com



OT 1600/500/4S

Open top vertical washing and drying machine for glass with a thickness from 3 up to 25 mm and with minimum dimensions of 350 mm.

The body of the machine and all parts in contact with water are made of stainless steel while an anti-corrosion covering is granted by epoxy and polyurethane paints. The machine is equipped with four brushes which are also available in the special version for low-E coated glass. Hot water can also be required. Drying is carried out by a pair of blowers powered by a high-pressure soundproof ventilator. The inlet and outlet conveyors, as well as glass thickness adjustment, are motorized, thus guaranteeing improved washing quality on every thickness. A black panel with inspection lamps can be applied on the outlet conveyor.



LATTUADA ROBOTIC SOLUTIONS

Adelio Lattuada, together with its strategic partner Knittel Glass, is offering robotic solutions for any type of need and application.

Increased automation levels, higher flexibility, big increase of the productivity, production optimization, costs reduction and increased safety are only few of the main characteristics.

Any kind of robotic application related to the glass industry can be evaluated (CNCs, double-edges, cutting, tempering or IG lines, etc.).

Regarding the pre-processing area, many different solutions and configurations can be offered: from the most sold solution with 2 edgers and 1 robot to fully automated cells with 2 machines and 2 or 3 robots. Also other configurations can be offered like 1 machine and 1 robot or 4 machines and 3 robots, for example.

Lattuada vertical washers as well as other new or already existing (Lattuada or third party) machines can be added to the lines.

Lattuada Robotic Solution is part of Lattuada's cyberAL project, which includes also A-WR and i-AL packages to increase machines automation to the top level.



The advantages of this solution are many, some examples:

- The quickest solution available on the market, a couple of real examples
 - 44 pieces/hour (1000 x 2000 mm)
 - 375 m/hour (1000 x 2000 mm) including dubbed corners
 - Up to 5 m/min
- The most sold and installed (more than 150 projects already installed by Knittel Glass)
- The widest experience in this field (since 2000 Knittel supplies robotic application in the glass industry)
- Easy use and reduced maintenance. What happens if the line stops? Our lines can, in most of the situations, continue from the point they have been stopped or resume and empty the line automatically
- Integration with third party software and many different ways to receive or read glass dimensions to be processed

TLR 10 C DD

Electronic straight-line edging machine for the processing of flat edges with arris, polished by liquid cerium wheels. The machine is also equipped with a dubbing device.

Read-outs placed on the control panel enable to set adjustments such as working speed and glass thickness. Mechanic glass clamping system. A centralized lubrication system avoids wheel wear and tear. The conveyor is composed of pads, made of a special material, which are mounted on precision chains.



Automatic adjustment of the arris wheels when the glass thickness changes. The wheels are fitted on spindles to which the movement is transmitted via toothed belts linked to the motors. Automatic polishing wheel intervention thanks to PLC-control. Adjustable inlet conveyor with which glass removal can be adjusted up to 5 mm.

AL 10 M

Electronic straight-line edging machine for the processing of flat edges with arris, polished by cerium wheel. Read-outs placed on the control panel enable to set adjustments such as working speed and glass thickness. Mechanic glass clamping system. A centralized lubrication system avoids wheel wear and tear. The conveyor is composed of pads, made of a special material, which are mounted on precision chains. Automatic adjustment of the arris wheels when the glass thickness changes. The wheels are fitted on spindles to which the movement is transmitted via toothed belts linked to the motors. Automatic polishing wheel intervention thanks to PLC-control. Adjustable inlet conveyor with which glass removal can be adjusted up to 3 mm.



CTS 3300/1000/6S

Closed-top vertical washing and drying machine for glass with thicknesses from 3 up to 80 mm and minimum dimensions of 400 mm. The body of the machine and all parts in contact with water are made of stainless steel, while an anti-corrosion covering is granted by epoxy and polyurethane

paints. The machine is equipped with six brushes, which are also available in the special version for low-E coated glass. Hot water can also be required. Drying is carried out by a pair of blowers powered by a high-pressure soundproof ventilator. The inlet and outlet conveyors, as well as glass thickness adjustment, are motorized, thus guaranteeing improved washing quality on every thickness. A black panel with inspection lamps can be applied on the outlet conveyor.



GAMMA 614

Straight-line bevelling machine for the processing of bevels polished by liquid cerium oxide.

Available both with electronic systems and PC.

This machine, conceived in order to satisfy the medium production levels, is equipped with all the devices that are necessary to simplify its use and maintenance. Read outs placed on the control panel enable to set adjustments such as glass thickness, bevel inclination and edge thickness in order to process the desired bevel. The wheels are fitted on spindles in order to allow rotation homogeneity and to avoid vibrations; movement is transmitted thanks to toothed belts

linked to the motors. The mechanical seal, an essential element of the spindle, is obtained thanks to the application of diaphragms. The conveyor is composed of pads, made of special material, which are mounted on precision chains. One of the peculiarities of the GAMMA 614 is that it is the first machine with four felts, positioning it at the top as far as working quality and speed are concerned.



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Arrissing or rough grinding in continuous cycle by two spindles follow-system.
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 Automatic survey of glass sizes and thickness.
 High-productivity guaranteed for double-glazing and tempering lines.
 System with oscillating spindles which ensures the regular execution of threads.
 Possibility of stand-alone installation or integrated with existing lines.



OPTIONAL TURBO-BLOWER

High pressure blower positioned on the outlet conveyor, provides high efficiency laminar air flows that allow the pushing of the processing water. By applying this optional the movement speed is significantly reduced.



OPTIONAL CENTRIFUGAL SYSTEM

System suitable for purifying the water through the use of a centrifuge by mechanical rotation, which divides solids from liquid.



OPTIONAL: Z AXIS DOUBLE TOOL

Flexible automatic system with tool holder cone which houses up to two wheels allowing to work float or laminated glass with different thicknesses.



OPTIONAL: PRE-WASHING

Stainless steel pre-washing device by pressure sprayed clean water washes the front and rear faces of the glass sheet, eliminating the glass powder produced during the processing.



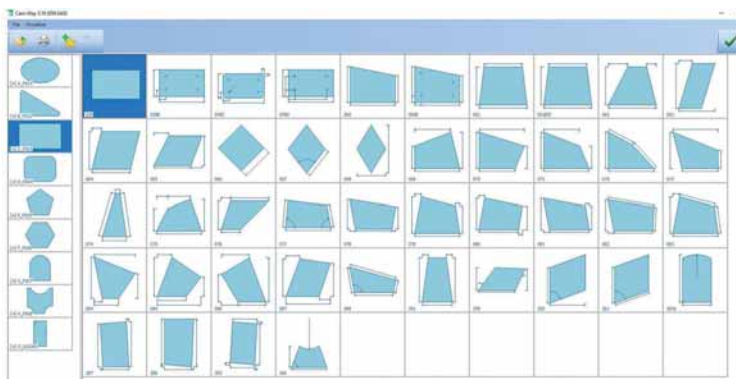
TURBO OUTLET CONVEYOR WITH DOUBLE MOTORIZATION

Turbo outlet conveyor is divided in two section allows an accelerated transport speed in the second section for a quick evacuation of the glass.



OPTIONAL: SOFTWARE FOR SHAPED GLASS

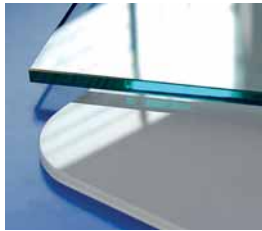
Optiway (Optima) software it's a CAM program provided with functions for the two-dimensional drawing and with a 3D graphic simulator of the working process allowing generation of arrissing/rough grinding cycles.



STANDARD SHAPED

SPEED EDGE

High-production vertical grinding machine for rough or polished grinding, round or flat edges, low-E glass with the possibility of performing shaped glasses with a straight horizontal support side and a maximum vertical angle of 90°.



The innovative suction cup system guarantees the locking of the entire sheet to be machined, allowing higher processing of squaring and respect of the size of the glass being machined.

Processing of big glass sheets in a limited space thanks to the compact system that integrates the loading and unloading in a single solution.

Ideal for series and to be combined with drilling lines or as stand-alone machines.



| Mod. | Min glass size mm. | Max. Glass size mm. | Glass thickness mm. | Max. Tool ø | Spindle | Kw | Rapid tool holder | Process |
|-----------|--------------------|---------------------|---------------------|-------------|---------|-----|-------------------|--|
| VAS 2.0.3 | 420x500 | 2000x3200 | 3 ÷ 21 | 1 ÷ 50 | 1 | 7.5 | ISO 40 | Arrissing - Rough grinding - Polishing |
| VAS 2.5.4 | 420x500 | 2600x4000 | 3 ÷ 21 | 1 ÷ 50 | 1 | 7.5 | ISO 40 | Arrissing - Rough grinding - Polishing |
| VAS 3.2.5 | 420x500 | 3200x5000 | 3 ÷ 19 | 1 ÷ 50 | 1 | 7.5 | ISO 40 | Arrissing - Rough grinding - Polishing |
| VAS 3.2.6 | 420x500 | 3200x6000 | 3 ÷ 19 | 1 ÷ 50 | 1 | 7.5 | ISO 40 | Arrissing - Rough grinding - Polishing |

OPTIONAL: SOFTWARE FOR SHAPED GLASS

Optiway (Optima) software it's a CAM program provided with functions for the two-dimensional drawing and with a 3D graphic simulator of the working process allowing generation of arrissing/rough grinding cycle.



OPTIONAL: PRE-WASHING

Stainless steel pre-washing device by pressure sprayed clean water washes the front and rear faces of the glass sheet, eliminating the glass powder produced during the processing.

bestmakina

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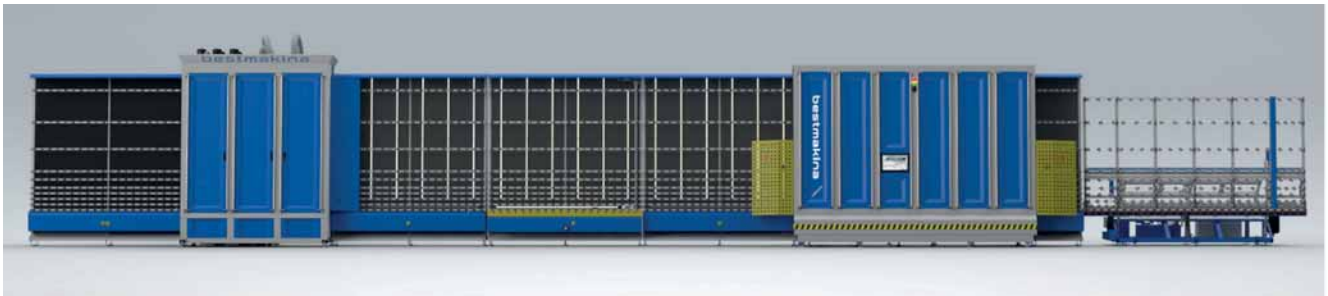
BWPG -AUTOMATIC WASHING AND COMBINING LINE WITH SERVO MOTOR DRIVEN -GAS FILLING PRESS

BWPG type lines are produced in various sizes and combinations of the stations. Optional features can be added in the scope of line in order to make it user friendly. Machine has rigid construction and durable components for a longer life time.
 Thanks to servo motor-controlled press unit; highest precision for unit thickness, assembly geometry and offsetting is guaranteed.

Available Options:

- Coating detection and control function
- Glass thickness detection and positioning of brushes
- Compatibility and adoption of quality scanners
- Synchronized water purification system
- Pre-washing zone for chipped processing
- Extra long conveyors for longer panes
- Multiple inert gas lines
- Tandem press units
- Tilting and transfer solutions

| | |
|-------------------------------|---|
| Height of Glass Pane (mm) | 1700-2000-2250-2500-2800-3000-3300mm |
| Length of Glass Pane | 3000-4000-6000mm |
| Gas Filling Length | 4000mm (upto H:2500mm) 4500mm (H:2800mm to 3300mm) 6000mm or more (by tandem press) |
| Gas Concentration | Min 90% |
| Press and Positioning of Axes | By Servo Motor |
| Offset For Stepped Glass | 70mm Standard Max 120mm (Optional) |
| Glass Thickness | 3-19mm Standard 3-40/50/60mm (Optional) |
| Unit Thickness | 90mm Standard 120mm Optional |
| Payload | 200kg/m Standard 300kg/m Optional |

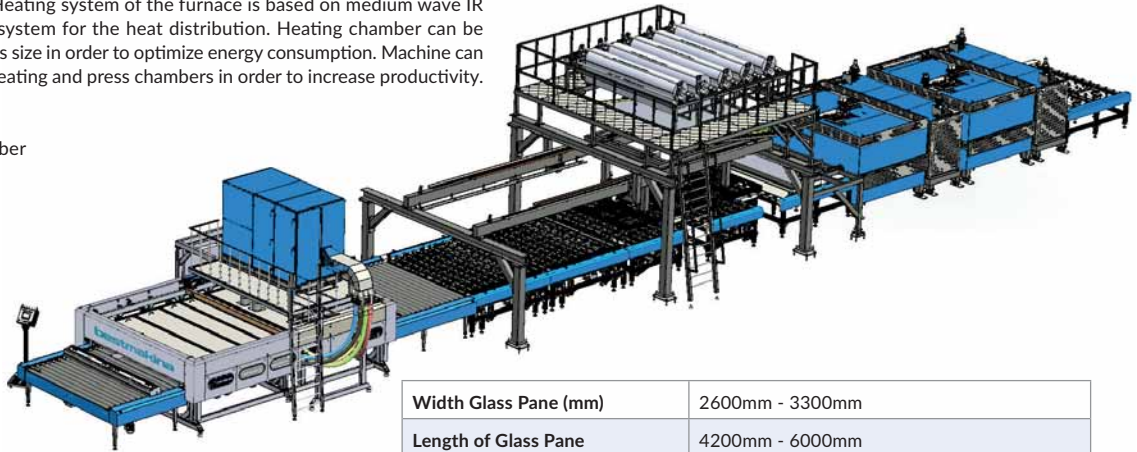


BLM- GLASS LAMINATION LINES WITH AUTOMATIC COUPLING, CONVECTIONAL FURNACE AND NIP ROLLS

BLM- Glass lamination lines are produced in rigid and precise construction for the best alignment accuracy. Heating system of the furnace is based on medium wave IR heaters and convectional system for the heat distribution. Heating chamber can be controlled according to glass size in order to optimize energy consumption. Machine can be configured in multiple heating and press chambers in order to increase productivity.

Available Options:

- Additional heating chamber
- Additional press unit
- Additional set of rolls



| | |
|-----------------------------|----------------------------------|
| Width Glass Pane (mm) | 2600mm - 3300mm |
| Length of Glass Pane | 4200mm - 6000mm |
| Number of Furnace | 1x 2400mm length as standard |
| Number of Nip Rolls | 1 |
| Press and Thickness Control | By Servo Motor |
| Multiple Layers | Possible |
| Thickness Control | Position and/or Pressure control |
| Number of PVB Rolls | Standard 5 (Optionally 10) |

BLS-S - AUTOMATIC TWO COMPONENT EXTRUDER WITH SERVO MOTOR DRIVEN PUMP

BLS-S is a full size automatic extruder having glass thickness and air cavity detection station, sealing station and off-loading station. Machine comes with single work material extrusion system. Durable transfer system minimizes the operational costs. Purging pump is delivered with machine to secure the mixing quality. User friendly HMI allows operator to set all parameters

Available Options:

- Secondary extrusion and metering line
- Slave barrel for base material line
- 200Lt barrel for catalyst line
- Additional conveyors for longer lengths than 5000mm
- Stepped glass sealing



| | |
|--|---|
| Height of Glass Pane (mm) | 1700-2000-2250-2500-2800-3000-3300mm |
| Length of Glass Pane | 3000-4000-6000mm |
| Sealing Length | 3000mm(standard) 4000mm (optional with single conveyors) 5000mm or more (by additional conveyors) |
| Mixing Ratio | Digitally controlled |
| Feeding Pumps (barrel to metering pumps) | Hydraulic |
| Metering Pumps | Servo Motor Driven |
| Unit Thickness | 90mm Standard 120mm Optional |
| Payload | 200kg/m Standard 300kg/m Optional |



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Extended machines Multi-machining

MASTER + ROS

Biesse offers robotically operated system that bring future proof advantages, improving and simplifying daily operations. Master Series is the machining centre dedicated to glass machining for the products that are typical of the furniture, automotive, building and domestic appliance sectors. It represent the best solution in terms of performance and productivity, and is suitable for high-speed machining of small and large production batches.

Master + ROS is the solution for factory automation that guarantee increases and reduces production costs thanks to:

- The possibility to work with twin stations, with piece loading and unloading while the machine is running.
- Reduced work time for the operator
- Simplification of the work for the operator, who only needs to manage the racks at the start and end of the machining batch.
- Machining operations that require no supervision and have no time limits (24/7)



COMBIFLEX

Combiflex, a multi-purpose machine able to execute multiple glass processes in reciprocal synergy. Glass dimension up to 1500x3000mm with different type and quality of edge finish can be processed on each glass side in less than 32m2.

The machine performs automatic loading, grinding, polishing, drilling, notching, water jet cutting, rounding corners, chamfering, washing and automatic unloading operations on flat glass, even out of square or shaped.

Combiflex has been designed to be self sufficient in the execution of all processes. From the loading of the raw glass to the unloading of the completely processed glass, the operator is not required to perform any adjustment during all processes, even with regards to thickness, shape or dimensional changes.

The machine configuration can also be implemented with optional equipment such as:

- Water jet technology
- Compact washing machine
- Automatic loading and unloading system
- MC - CNC work centre
- MC - CNC working centre.

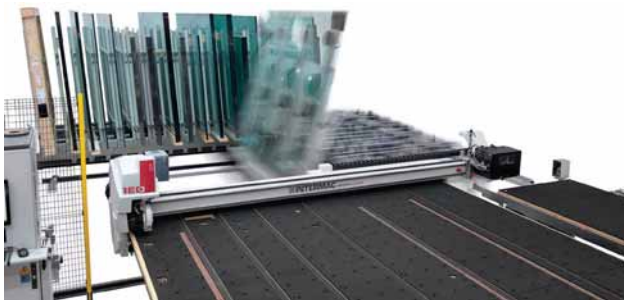


Cutting

GENIUS CUTTING LINE

Genius cutting line can be integrated with Movetro solutions for the storage and handling of glass sheets, transforming production context needs into reality. These solutions are tailor made and designed to enhance company performance, optimising levels of automation, efficiency and safety of the production unit.

The automatic and/semi-automatic classifiers are the ideal solution for storing large quantities of glass in small spaces, making it quickly and easily available for machining: handling is carried out electrically, in conditions of complete safety.



The single-direction or twin-direction telescopic loading devices can load regular, jumbo or extra-jumbo sheets. The supervisor software shows the magazine situation in real time and receives the instructions for loading, moving and returning sheets in an entirely automatic manner thanks to its integration with the cutting line optimiser. The same information can be shared with the materials provisioning office.

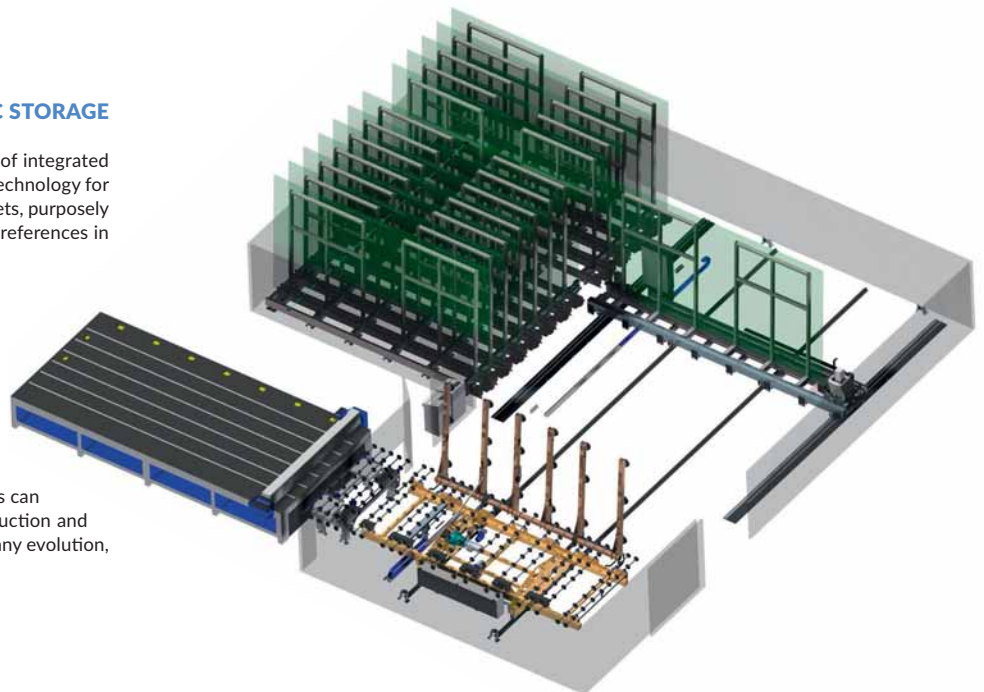
SWIFT SHUTTLE ADVANCED DYNAMIC STORAGE FOR MASS PRODUCTION

Swift Shuttle is the latest addition to the range of integrated storage solutions for cutting lines. It's the ideal technology for storing and handling jumbo and regular glass sheets, purposely designed to provide a higher number of cutting references in a very compact space.

INSERTING THE SWIFT SHUTTLE IN THE PRODUCTION CONTEXT, THE ADVANTAGES CAN BE SEEN IMMEDIATELY:

- Footprint reduction
- Increased productivity
- Greater safety

The design and construction modularity of Movetro shuttle systems ensures that customers can configure their own magazine to suit their production and logistics needs, always keeping abreast of company evolution, as the systems can be expanded at any time after installation.



Sortiflex is an automatic glass handling and storage system. It has been designed to meet the flexibility requirements of various processes thus it can work within Biesse Glass machineries or integrated with all the other major equipment in flat glass field.

It works as a temporal buffer to optimize glass flows from different origins toward single output, or from single origin toward multiple outputs.

The patented double-deck storage area doubles, improving the number of available slots on the same footprint, and increasing the storage area without requesting more factory floor space.

The extremely fast and reliable cycle time allows various processes to be directly linked in full automatic mode. Sortiflex can work only with Forvet Navetta 45 system (loading/unloading shuttle).



Standalone machines Multi-machining

INTERMAC MULTI PRO M

Intermac Multi Pro is the vertical machining centre based on a revolutionary workpiece handling concept: Ideal for medium and large companies that want to have advanced technology and productivity.

FINISHING QUALITY

Excellent edge finish quality thanks to the Pilot System that supports the glass in a stable manner during the processing phases.

PRODUCTIVITY

Batch one productions with zero set-up times thanks to automatic workspace set-up and IC software optimization. Reduction of production times by favouring loading and unloading of pieces in hidden time.

SAFETY

High standard of operator safety thanks to laser scanners positioned in the loading and unloading areas and integrated with the machine software.

FLEXIBILITY

Wide range of finished products guaranteed by the new Helix drilling function (drilling/countersinking). Automatic waste management thanks to the configuration of the suction cup carriages and the IC software. Multiple machining operations available: grinding, polishing, milling, drilling/countersinking and araising.



Helix is the Diamut tool that, when combined with Biesse software, exceeds all the limits of the traditional drilling systems, using one single tool for all the boring and countersinking operations on glass sheets of up to 19mm.



Cutting

GENIUS CT-NEXT

Genius CT-NEXT is the new range of 3-axis cutting tables for making straight and shaped cuts on sheets of float glass. They combine perfectly with loading systems and can be interfaced with shearing tables in small and medium sized firms.

- Unprecedented reliability over time
- Machining productivity with top class components
- Perfect integration with production lines with dependent loading/unloading systems
- User-friendly technology.



GENIUS LM-A

Genius LM-A is the range of laminated glass cutting tables for companies that need high levels of productivity, with requirements of more than 400 square metres per shift and the option of automating the entire cycle, from loading to unloading of the finished volume. Patented by Biesse, these extremely innovative solutions enable the insertion of a line for laminated glass in drastically reduced spaces, with no compromises with regard to productivity.



GENIUS COMBY PLUS

The Comby PLUS are high productivity lines which are integrated into small spaces for the cutting of both float and laminated glass, and are the product of the intelligent combination of the Genius CT-PLUS cutting table (for cutting float glass) and the Genius LM-A cutting table (for cutting laminated glass). The CombyPlus Lines represent the perfect integration of the two float/

laminated cutting tables which guarantee high productivity in small spaces thanks to the addition of: Intermac-patented vertical buffer on float table belts on laminate cutting module manual break-out on float glass addition of break-out bars integrated with the belts possible.



PRIMUS

The Primus Series is the range of waterjet cutting machines designed to meet the needs of companies looking for maximum versatility.

- Ideal for cutting any type of material and for performing all complex shaping operations
- High quality and precision and optimum cut finish
- Excellent performance and optimisation of cutting costs
- Cutting-edge technology thanks to the patented intermac c-axis infinite rotation system
- Set-up times reduced to zero thanks to the simplicity of the fixing and setting systems.



Edging

BUSETTI F

Competitive and efficient, those are the key words when responding to an increasingly demanding market: Intermac meets the expectations of the glass industry with highly personalised solutions and elevated reliability. Intermac develops cutting edge machines and systems for bilateral grinding, allowing our customers to exploit the Fourth Industrial Revolution and become "Smart Factories".

The Intermac technological solutions guarantee high-quality, reliable performance over time. The Busetti F of double-edging machines and systems that ideal for applications such as structural façades, interior structural elements, glass for furnishings, household appliances and solar panels, which call for reliable and customisable solutions that provide for the highest quality and precision along with total flexibility, with minimum operator intervention.

Our spindles allow for several configurations, which means they can be completely personalised to achieve special machining of borders for furniture, the structural sector, and dividing walls.

Innovative solutions, including automation, make for a production line that is flexible and performs well even for small batches and a variety of thicknesses. At the same time, innovate systems like the presetter for diamond grinding wheels, automatic management of polishing pressures, motorised lubber lines and other optionals help reduce setting times and simplify use of the lines.



CHIARA SERIES

The Chiara has been designed to achieve flexibility and productivity for glass from 2000x3000mm up to 3300x18000mm with 8/10 spindles grinding heads working on multiple sides and out of square. The possible integration with a CNC work centre on the Multiflex model, allows to perform polished radii in the corners, notches, milling, drilling, without having to reposition the glass. Moreover, it allows to obtain both flat and round edge profiles. The overlapping of two different machining processes on a stationary sheet doesn't require any large sheets handling thus eliminating the risk of damage during transport and zeroing errors, with the consequent dimensional inaccuracies of the machining. Moreover, the machine is able to handle two pieces simultaneously, even if they are different from each other. What really makes the Chiara a unique solution in the configuration for large glass sizes is its small footprint on the shop floor. In fact, when comparing a Chiara straight line to a double edger with the same maximum dimensions, the Chiara will only use 1/3 of the space required.



Drilling

FRANCESCA FC 16M

The Francesca FC 16M range represents the synthesis of the most advanced technology applied by Biesse to the glass drilling and milling processes. The machine carries out drilling, countersinking and milling operations on flat glass including those with irregular shapes. Ideal for the following Industries: shower enclosures and doors, shop windows, balustrades, partition walls and interior design.

FINISHING QUALITY

Robust structure which ensures exceptional finishing quality and machining precision. Patented belt conveyor system with dynamic vacuum, ideal for processing Low-E glass (available on some models).

PRODUCTIVITY

Production with zero tooling times, achieved through the use of 2 maybe use the word opposing multi-spindle heads. +15% productivity courtesy of the Super Spindle option.

OPERATOR CARE

Ergonomic machine design with high-standard safety devices designed to protect the machine operator.

FLEXIBILITY

Multiple processes can be carried out, including drilling, countersinking and milling, with no size limits. Machining processes using both diamond and waterjet tools.



The Francesca* range combines two technologies - drilling with diamond tools and waterjet cutting - in a single machine, expanding production capacity.





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CNC PRATICA PLUS

PRACTICALLY PERFECT IN EVERY SITUATION

Bottero machining centres are extremely powerful and flexible machines that can perform many processing operations with precision and reliability, such as profiling, drilling, edge finishing, cutting and much more. The ease and intuitiveness of the software are a great strong point for these machines that can be used in any high-tech glass factory. Bottero machining centres can operate both on glass and on stone, making their use even more flexible.

After the success of the first version, the Bottero Pratica CNC workcentres have evolved with the new PLUS version.

Both 3- and 4-axes versions are equipped with the new high performance pressurised spindle.

THE STANDARD VERSION OF THE MACHINE IS ABLE TO PERFORM THE FOLLOWING OPERATIONS ON GLASS SHEETS:

- Milling on the sheet with a rectilinear and/or curvilinear path.
- Edging and radial polishing on a straight and/or curved path on the edge of the sheet.
- Drilling and/or countersinking perpendicular to the surface of the sheet.
- Writing and drawing on the top side of the sheet.

BY USING OPTIONAL EQUIPMENT, THE POSSIBILITIES ARE EXPANDED TO:

- Cutting with a straight diamond disc.
- Cutting with a straight diamond disc angled at 45°.
- Writing and drawing on the side surface of the sheet.
- Straight and/or curved bevelling on the top side of the sheet.
- Straight and/or curved engraving on the top side of the sheet.
- Straight and/or curved cup grinding on the side surface of the sheet.
- Drilling on the underside of the sheet.



| Electro spindle | | 2500 | 3300 | 4000 |
|-------------------------------------|-----|----------------------|----------------------|----------------------|
| Maximum rotation speed | rpm | 10.000 | 10.000 | 10.000 |
| Power in continuous service (S1) | Kw | 9,2 | 9,2 | 9,2 |
| Torque in continuous service (S1) | Nm | 30,3 up to 3.000 rpm | 30,3 up to 3.000 rpm | 30,3 up to 3.000 rpm |
| Power in intermittent service (S6) | Kw | 11,04 | 11,04 | 11,04 |
| Torque in intermittent service (S6) | Nm | 36,4 up to 3.000 rpm | 36,4 up to 3.000 rpm | 36,4 up to 3.000 rpm |

| Tools magazines | | 2500 | 3300 | 4000 |
|-----------------------|------|------------|--------------|--------------|
| Magazine type | - | fixed | fixed | mobile |
| Without C axis | pos. | 10 + 10 | 13 + 13 | 18 + 18 |
| With C axis | pos. | max. 8 + 8 | max. 11 + 11 | max. 15 + 15 |
| Maximum tool diameter | mm | 150 | 150 | 150 |

| Weight | | 2500 | 3300 | 4000 |
|--------|--|----------|----------|----------|
| Weight | | 3.990 Kg | 4.180 Kg | 4.800 Kg |

| Maximum glass processing * | | 2500 | 3300 | 4000 |
|----------------------------|----|-------------|-------------|-------------|
| Standard configuration ** | mm | 2545 x 1620 | 3300 x 1620 | 4300 x 2320 |

* With 100 mm tool diameter

** Standard configuration for 3300 = left fixed tools storage / 3 axis

Standard configuration for 4000 = left mobile tools storage / 3 axis. For all the other configurations check the technical specifications



DOUBLE EDGERS FLAT EDGE

THE IDEAL CHOICE FOR INTENSIVE APPLICATIONS

Bottero produces a complete range of solutions for flat edge bilateral grinding, which can satisfy the requirements of small-, medium- and large glass factories with fixed or flexible production, thanks to the vast possibilities of choice and configuration of the products.

Bottero machines are ideal for processing structural glass, partition walls, shower cubicles, shelves, balustrades, steps and furnishing elements, providing productivity, precision and reliability over time to operate on multiple shifts, up to 24/7 service.

The Bottero flat edge bilateral machines are designed to support the high production flows typically required by the industry. Thanks to the significant flexibility, however, these machines are effective and profitable even when applied in small- and medium glass factories with flexible production.

TwinEdge

The four configurations that make up the Twin-Edge range enable the processing of flat edges, threads and possible edge-removal.

| Twin Edge | 220 N | 222 D | 222 L | 224 N |
|-------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Minimum glass dim | 160 x 160 mm | 160 x 160 mm | 160 x 160 mm | 160 x 160 mm |
| Glass thickness | 3 ÷ 30 mm | 3 ÷ 30 mm | 3 ÷ 30 mm | 3 ÷ 30 mm |
| Speed | 0,6 ÷ 6 m/min (1 ÷ 10 m/min opt.) | 0,6 ÷ 6 m/min (1 ÷ 10 m/min opt.) | 0,6 ÷ 6 m/min (1 ÷ 10 m/min opt.) | 0,6 ÷ 6 m/min (1 ÷ 10 m/min opt.) |
| Installed power | 55 KVA (45 KW) | 61 KVA (45 KW) | 61 KVA (45 KW) | 66 KVA (45 KW) |
| Weight | 6090 Kg | 6170 Kg | 6170 Kg | 6250 Kg |

| | |
|--------------------|----------------|
| Minimum glass dim* | 115 x 115 mm |
| Glass thickness | 3 ÷ 40 mm |
| Speed | up to 12 m/min |
| Max glass weight | 1000 Kg |
| Worktable height | 970 ± 50 mm |
| Max opening speed | 30 m/min |

* the minimum glass dimension can change depending on options included

Flex Edge

Flex Edge bilateral edging machine can be configured with 10, 12, 14, 15 or 17 grinding wheels. The machine is particularly suited to process large sizes and thickness and the double edger platform can be integrated with totally automatic lines for flexible production, in small or large batches, with automatic dimension changeover managed by dedicated software.

DOUBLE EDGERS PENCIL EDGE

TECHNOLOGY AT THE SERVICE OF THE INDUSTRY

Bottero pencil-edge bilateral machines are the ideal machines for processing at high production rates, typical of the household appliance, automotive, industrial refrigeration, TV screen and solar panel production sectors. In these contexts, where the demand for productivity is accompanied by the need for reliability and automation, the solutions offered by Bottero have been chosen by some of the largest industrial groups in the world for the implementation of plants that can treat thousands of square metres of product per day.

Bottero's pencil-edge bilateral machines contribute to the treatment of glass elements used in numerous industrial manufacturing products.

The Bottero range of double edgers for pencil edge machining has been designed to guarantee high precision and to minimise maintenance.

Gemini

The Gemini double edger is a safe and reliable machine, designed to guarantee high precision and limit maintenance as much as possible.

| Gemini | 306 N | 306 HP | 308 N | 308 HP |
|-------------------|--------------------|-----------------|-----------------|-----------------|
| Minimum glass dim | 80 x 80 mm | 80 x 80 mm | 80 x 80 mm | 80 x 80 mm |
| Glass thickness | 2 ÷ 12 mm | 2 ÷ 12 mm | 2 ÷ 12 mm | 2 ÷ 12 mm |
| Speed | 1 ÷ 12 m/min | 2 ÷ 20 m/min | 1 ÷ 12 m/min | 2 ÷ 20 m/min |
| Installed power | 24,5 KVA (19,2 KW) | 47,5 KVA (38KW) | 28 KVA (22,4KW) | 47,5 KVA (38KW) |
| Weight | 2420 Kg* | 2420 Kg* | 2500 Kg* | 2500 Kg* |
| Worktable height | 900 ± 50 mm | 900 ± 50 mm | 900 ± 50 mm | 900 ± 50 mm |

*Max glass 1600 mm



FLEX LAMILINES

FLEX LAMILINES - PRODUCTIVITY AND FLEXIBILITY AT THE HIGHEST LEVELS

Bottero's Flex lines offer high performance and great flexibility, thanks to the possibility of laminating jumbo sheets with particularly short production cycles that laminate already shaped glass of up to 10 layers. Bottero technology, chosen by the world's largest laminated glass producers, is now available to all state-of-the-art glassworks thanks to the Flex lines. Laminated glass finds new and ever more interesting applications every day, offering architects and designers unique and expressive opportunities. Bottero is committed to supporting the development and diffusion of this material, constantly researching and developing technologies to improve its processing, thus widening its horizons of use.

Bottero experience

Since its first line in 1989, Bottero has always been partner of companies worldwide for laminated glass production.

In 25 years, Bottero has reached and maintained an undisputed technological leadership in laminated glass processing, serving all multinational companies and developing top-performance devices for maximum productivity and the highest quality.

Today, all this know-how is also available in custom-sized production at an affordable price.

- 25 years of experience
- 52 lines worldwide
- Complete process know-how

Bottero flex Lamelines are the most advanced custom-sized laminated assembly systems in the market today. The nip rolls and furnaces, which are provided as standard, are the same ones up and running all over the world by the most important glass manufacturers.

The IR furnace and the patented mechanical press system on the nip rolls are just two of the several patents and innovations which guarantee the best final result in lamination.

Bottero produces laminated glass lines both for stock sheets, high capacity production, as well as for the custom market of cut-to-size laminated glass. These lines are capable of easily manufacturing different product types irrespective of dimensions, shape and make-up. This key factor is achieved



by implementing a strategy focusing on quality, reliability and total flexibility of the manufacturing plant.

Unique features

Flex Lamiline is equipped with the most advanced solutions for the pre-lamination process, such as the nip roller with anti-torsion system and forced air convection furnaces. Moreover, it can easily be adapted according to customers' needs with optional equipment and accessories such as automatic loaders, additional PVB rolls, automatic PVB foil application, cutting and trimming... Bottero is capable of providing complete turnkey packages, including autoclaves, climatic rooms and all accessories required.

Technical features

Bottero Flex Lamiline is a modular system which is completely configurable, according to each customer needs from small to large glass sheets.

Most options and upgrades can also be added later with a simple and effective intervention.

| | Metric | Imperial |
|------------------------------|--|--------------------------------|
| Glass sizes (min) | 350 x 180 mm | 14" x 7" |
| Glass thickness | 3 - 19 mm | 8/64" - 48/64" |
| Type of glass allowed | Float Low-e Tempered Coated | |
| Glass thickness output (max) | 100 mm | 4" |
| Glass weight output (max) | 1350 kg | 2980 lb |
| Interlayers thickness | 0,38 mm 0,76 mm 1,14 mm 1,52 mm | 1/64" 2/64" 3/64" 4/64" |
| Type of interlayers allowed | Interleaved PVB EVA SentryGlass Plus | |

FLOAT CUTTING BKM

BKM, THE ART OF CUTTING GLASS

Designed for glassmakers who want to evolve their business by adopting automated and flexible cutting systems, BKM tables offer all the quality and ease of use typical of Bottero products.

Thanks to the shared single development platform, common to all cutting systems, BKM tables use technological solutions and components that are also adopted on top of the range Bottero systems, thereby ensuring uncompromising performance and reliability.

BKM cutting systems can perform linear cuts and shapes on sheets with a thickness of up to 19 mm, thereby offering the possibility of carrying out small and medium production runs in series, as well as special pieces.

| | |
|---|-----------|
| Working speed | |
| Maximum bridge speed | 150 m/min |
| Maximum carriage speed | 150 m/min |
| Maximum grinding speed with Easy deletion | 80 m/min |

| | |
|--|-----------|
| Accuracy | |
| Cutting accuracy on straight processes | ± 0,15 mm |

| | |
|------------------------------|-----------|
| Thicknesses which can be cut | |
| Glass thickness | 2 ÷ 19 mm |

| | |
|------------------|-------------|
| Work table | |
| Worktable height | 930 ± 40 mm |



BKM cutting systems are available both in stand-alone versions, for loading, cutting and breakout of material on the table, as well as in fixed structure version for high productivity in-line integration. All models can be equipped with a wide range of accessories.

Each constructive and functional feature of the BKM range is designed to ensure extreme processing precision and maximum productivity, at the service of each specific production requirement.

Performance

A complete, modular and versatile range, fully configurable according to each specific production requirement.

Bottero tables guarantee top performances at 360°: cycle execution speed, accuracy and reliability over time.



FLOAT CUTTING BCS

BCS: THE HIGHEST PRODUCTIVITY AND QUALITY STANDARDS IN THE INDUSTRY

BCS cutting tables are designed to withstand the high workloads typically adopted during single- or even multiple-shift production of windows or panels in the furniture sector, as well as components for household appliances, in the automotive industry and in many other areas. BCS cutting tables are among the most popular and sought-after in the world, representing a major benchmark in terms of production capacity and reliability in today's market.

The BCS range stands out due to its modularity and versatility, thanks to which the float cutting tables can be configured completely according to specific customer requirements: from stand-alone cutting tables intended for small production runs, up to intensive high automation level production systems, fully integrated with low-E grinding devices and marking, as well as loading and breakout modules.

With the aim of meeting all production needs, the BS cutting tables also enable the fitting of the cutting carriage with one of the numerous accessories available. Each constructive and functional feature of the BCS range is designed to ensure extreme processing precision and maximum productivity, at the service of each specific production requirement.

Performance

A complete, modular and versatile range, fully configurable according to each specific production requirement. Bottero tables guarantee top performance at 360°: cycle execution speed, accuracy and reliability over time.

| Working speed | |
|---|------------|
| Maximum bridge speed | 140 m/ min |
| Maximum carriage speed (*) | 200 m/ min |
| Maximum grinding speed with Easy deletion | 80 m/ min |
| Maximum grinding speed with LMT | 160 m/ min |

(*) the maximum carriage speed is 160 m/min in the presence of LMT, PPL or LAM Shape set-ups.

| Thicknesses which can be cut | |
|------------------------------|------------|
| Standard thicknesses | 2 ÷ 19 mm |
| Optional thickness | 19 ÷ 25 mm |

| Accuracy | |
|--|--------|
| Cutting accuracy on straight processes | ± 0.15 |

| Work table | |
|------------------|-------------|
| Worktable height | 930 ± 40 mm |

FLOAT CUTTING EVO

EVO, THE PLATFORM THAT GOES BEYOND CUTTING

The EVO cutting platform is the top of the range of Bottero cutting systems, offering exclusive performance and flexibility. Thanks to the option of equipping the machines with two additional tools besides the cutting tool, EVO systems can, in addition to low-E glass grinding, also be equipped with laser cutting or labelling of the processed pieces. This option makes EVO systems ideal to form part of automated and controlled production flows, typical in high-tech glass factories and indicated in "Industry 4.0" regulations.

The EVO range stands out due to its modularity and versatility, thanks to which the float cutting tables can be configured totally according to specific customer requirements: from stand-alone cutting tables intended for small production runs, up to intensive high automation level production systems, fully integrated with low-E grinding devices and marking, as well as loading and breakout modules.

Each constructive and functional feature of the EVO range is designed to ensure extreme processing precision and maximum productivity, at the service of each and every specific production requirement.

| Working speed | |
|---|-------------|
| Maximum bridge speed during cutting | 160 m/min |
| Maximum carriage speed during cutting | 200 m/min |
| Maximum carriage speed during cutting | 200 m/min* |
| Maximum carriage speed with 2 tools (Cut + PPL) | 200 m/min |
| Maximum carriage speed with 2 tools (Cut + Laser) | 160 m/min |
| Maximum cutting bridge speed with 2 tools | 160 m/min* |
| Maximum cutting bridge speed with 3 tools | 160 m/ min* |

(*)100 m/min with TPF

| Thicknesses which can be cut | |
|------------------------------|-----------|
| Standard thicknesses | 2 ÷ 19 mm |
| Optional thickness | 2 ÷ 25 mm |

| Accuracy | |
|--|-----------|
| Cutting accuracy on straight processes | ± 0,15 mm |

| Work table | |
|------------------|-------------|
| Worktable height | 930 ± 20 mm |



Performance

A complete, modular and versatile range, fully configurable according to each specific production requirement. Bottero tables guarantee top performance in terms of cycle execution speed, accuracy and reliability over time.

LAMINATED CUTTING MACHINE

THE VALUE OF A UNIQUE EXPERIENCE

Bottero was among the first companies in the industry to believe in the potential of laminated glass, and started developing automatic cutting machines as early as the 1970s. For over 25 years, Bottero has been, and still is, the only company in the world with the know-how and organisation required to manufacture both machines and lines for the production of laminated glass, and can therefore provide its customers with a unique experience, which turns into excellent processing results and extremely reliable solutions.

Bottero's range of applications of laminated glass is becoming more and more interesting and diverse, thus offering architects and designers unprecedented expressive opportunities. Bottero is committed to promoting the development and popularity of this material by constantly researching and developing new technological solutions able to improve processing opportunities and thus increase its possible range of applications.

All manufacturing and running features of the laminated glass series have been designed in order to grant top level accuracy in glass processing and the highest production level aimed at meeting any production need.



Dual Line

Combined lines for cutting laminated and float glass.

Semi-Auto

520 LAMe + 353 BCS

The 520 LAMe cuts and breaks trims with a minimum width of 20 mm. In addition to scoring the float glass, the BCS cutting bridge can be used to label, cut the laminated glass to shape, remove low-E on all types of sheets based on the chosen set-up (see specific BCS catalogue) and, when combining the two machines, can assist the 520 LAMe during sheet positioning, thanks to a specific suction cup system.

Fully-Auto

548 LAM + 363 BCS/EVO

The 548 LAM can be combined with a belt loading table. Breakout and detachment of 20 mm trims and automatic positioning for diagonal cuts ensure fully automatic, high production levels. If combined with the float glass cutting table, the bridge can also be used to label, cut the laminated glass to shape, remove low-E on all types of sheets based on the chosen set-up (see specific BCS/EVO catalogues).

| | 515 LAMe | 520 LAMe | 548 LAM |
|-----------------------------------|-----------------|-------------------|--------------------------|
| Cutting speed | 100 m/min | 100 m/min | 140m/min |
| Grinding speed with Easy deletion | N/A | up to 80 m/min* | N/A |
| Grinding speed con opt. Low-E | N/A | N/A | 140m/min |
| Max cut | 3700 4600 mm | 3700 4600 mm | 3800 4950 mm 6100mm |
| Min cut | 250 mm | 250 mm | 150 mm |
| Min thickness | 2.2.0,38 PVB mm | 2.2.0,38 PVB mm | 2.2.0,38 PVB mm |
| Max thickness | 8.8.4,56 PVB mm | 8.8.4,56 PVB mm | 8.8.4,56 PVB mm |
| Opt. thickness | N/A | 10.10.2,28 PVB mm | 12.12.2,28 PVB mm |
| Max squaring length | 3210 mm | 3210 mm | 6100 mm** |
| Max weight loadable on arms | 450 Kg | 450 Kg | 700 Kg |
| Tolerance | +/- 0,5 mm | +/- 0,5 mm | +/- 0,5 mm |
| Height of working table | 930 +/- 20 mm | 930 +/- 20 mm | 930 +/- 20 mm |

(*) Depending on type of glass and quality requirements.(**) With optional unloading table.

Performance

Bottero tables provide 360° top level performance in all areas: cycle time speed, accuracy and reliability in the long term.

GLASS STOCK MANAGEMENT SYSTEMS

THE SOLUTION TO ALL REQUIREMENTS

Bottero solutions for material storage and handling are the answer to the requirements of all glass factories that want to make the connection between material storage areas and production lines more efficient and rapid. Bottero systems make warehouses compact and optimised, and speed up the connection between the storage area and processing lines, while offering the possibility of quickly managing sheets that differ in material, format and thickness.

Automation or optimisation of the warehouse management system is an important development element for any glass factory.

The widest range of products for any production and storage management requirement with any automation level. Whether you have large or small spaces, whether you process numerous types of glass in variable formats, or whether you produce a single product, Bottero can provide the machine or combination of machines that is suitable to improve work flows.





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605 Movable racks

An extremely cost-effective and flexible solution for compact automated glass storage. The comprehensive range of racks keeps floor space requirements to a minimum.

636 Rack system

Reliable and practical stand-alone, or automated overhead loader integrated warehouse systems. Every rack system is made up of one fixed rack and one motorized rack, whereas the following are movable racks.

620|630|640 Loaders

These machines are recognized worldwide for their high degree of flexibility, reliability and ease of use. They can handle glass from 2 up to 25 mm with a Glass rack depth of 1200 mm. Unique system for pneumatically assisted glass detachment, with mechanically actuated arm movements.

621|631 Loaders

These loaders are suitable for standard line configuration to handle glass sheets from 3 up to 19 mm with a Glass rack depth of 1000 mm.

650 Shuttle system

Ideal system for the management and storage of different types of glass and for buildings with restricted height not suitable to accommodate overhead type loaders. The ultimate solution to manage an unlimited number of racks feeding an unlimited number of cutting lines.



695 Gantry system

A unique telescopic frame system allows to organize a very flexible storage area with a combination of jumbo and regular sized glass positions: in particular it is possible to load only one regular glass size, when needed, from racks with two rows of regular sheets placed at the side. This system provides the most versatile solution for warehouse management and is designed to load glass sheets from any rack with any pack depth.

STRAIGHT LINE EDGING & BEVELLING

UNCOMPROMISED QUALITY

Bottero's vertical edge grinding and bevelling machines allow the highest quality results to be achieved when processing edges, thereby guaranteeing perfect finish in the most elegant applications, in which quality is considered an essential element.

Bottero's vertical edge grinding and bevelling machines offer great expressive possibilities and are well suited to produce sophisticated furnishing elements.

These vertical edgers and bevelling machines are designed to ensure maximum production and maximum reliability. The availability of numerous machine set-up configurations allows to choose the right product for both simple and extremely advanced processing operations.

Victralux

Victralux is Bottero's range of Straight Line Edgers. The five models available within this range of machines enables to process edges with arrisses, as well as the possible dubbing system.



| Victralux | 108 FX | 108 FX-HP | 110 FX | 110 FX-HP | 111 FX | 111 FX-HP | 109 CDX | 109 CDX-HP | 112 FX | 112 FX HP |
|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Minimum glass dim | 40 x 40 mm | 100 x 100 mm | 40 x 40 mm | 100 x 100 mm | 40 x 40 mm | 100 x 100 mm | 40 x 40 mm | 100 x 100 mm | 40 x 40 mm | 100 x 100 mm |
| Glass thickness | 3 ÷ 30 mm | 3 ÷ 30 mm | 3 ÷ 50 mm | 3 ÷ 50 mm | 3 ÷ 50 mm | 3 ÷ 50 mm | 3 ÷ 30 mm | 3 ÷ 30 mm | 3 ÷ 30 mm | 3 ÷ 30 mm |
| Speed | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min | 0,6 ÷ 6 m/min |
| Installed power | 23,5 KVA | 23,5 KVA | 27 KVA | 27 KVA | 27 KVA | 27 KVA | 23,5 KVA | 23,5 KVA | 29 KVA | 29 KVA |
| Weight | 3200 Kg | 3200 Kg | 3600 Kg | 3600 Kg | 3600 Kg | 3600 Kg | 3200 Kg | 3200 Kg | 3600 Kg | 3600 Kg |

Variant

Variant is Bottero's range of variable angle Straight Line Edgers.

The eight models available within this range of machines allows to process the flat edges of an angle up to 45° as well as to remove arrisses.

| Variant | 810 BC-BR | 810 BCS-BRS | 810 CD | 810 CDS |
|-------------------|---------------|---------------|---------------|---------------|
| Minimum glass dim | 100 x 100 mm | 40 x 40 mm | 100 x 100 mm | 40 x 40 mm |
| Glass thickness | 3 ÷ 55 mm | 3 ÷ 55 mm | 3 ÷ 55 mm | 3 ÷ 55 mm |
| Speed | 0,4 ÷ 6 m/min | 0,4 ÷ 6 m/min | 0,4 ÷ 6 m/min | 0,4 ÷ 6 m/min |
| Processing angle | 0 ÷ 45° | 0 ÷ 45° | 0 ÷ 45° | 0 ÷ 45° |
| Installed power | 27 KVA | 27 KVA | 27 KVA | 27 KVA |
| Weight | 4600 Kg | 4600 Kg | 5200 Kg | 5200 Kg |



Vision

The five models available within this range, produce bevels on the front face of the glass and either simple pencil edge profiles on the edge of the glass, or with the 913T, full flat edges and arris profiles.

| Vision | 907 | 910 |
|----------------------|--------------------|--------------------|
| Minimum glass dim | 40 x 40 mm | 40 x 40 mm |
| Glass thickness | 3 ÷ 30 mm | 3 ÷ 30 mm |
| Speed | 0,4 ÷ 6 m/min | 0,4 ÷ 6 m/min |
| Processing angle | 3 ÷ 45° | 3 ÷ 45° |
| Max corner edge dim. | 40 mm (50 mm opt.) | 40 mm (60 mm opt.) |
| Installed power | 23,5 KVA | 32 KVA |
| Weight | 3600 Kg | 4600 Kg |

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EDGING MACHINES

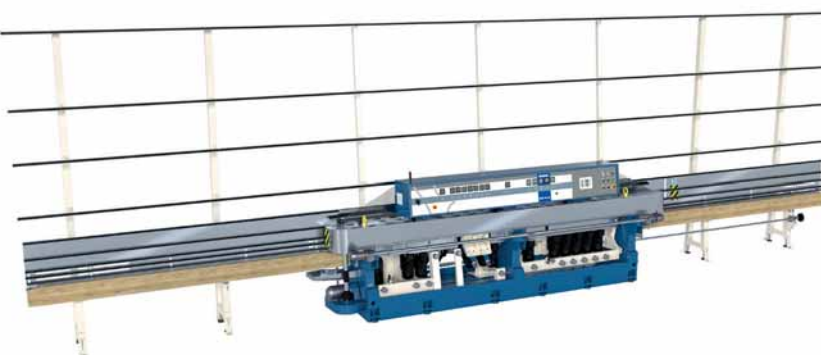
The Bovone ELB series straight-line edging machines guarantee the highest quality of both flat and inclined edges, even at the highest working speeds, optimizing customers' production. Most machine models are also equipped with Cerium oxide processing, elevating polishing quality to the utmost.

The machines' solid cast iron base and cutting-edge construction solutions are integrated with high-end electronics, while the dedicated software allows a very intuitive use of the machine.

The wide range of models enables to satisfy each and every need, from the processing of 'micro' pieces with extraordinary finish, up to large panels for outdoor architecture. The very high customization potential of each individual model is then oriented towards maximizing the response to specific customer needs.

The edging machines of the ELB series can be integrated into fully automated robotic systems: the Bovone Robotic Systems - BRS.

| Machine type | Wheels number | Min piece dimension | MAX Speed | MAX thickness |
|--------------|---------------|-----------------------------------|-------------------------------|-------------------------|
| Straight | 10 to 14 | 35 x 35 25 x 50 | from 5.4 m/min to 10 m/min | From 30 mm to 100 mm |
| 45° miter | 10 to 17 | 65 x 65 at 0° 105 x 105 at 45° | Up to 5.4 m/min | From 30 to 90 mm |



| Wheels number | Min piece dimension | MAX Speed | MAX thickness |
|---------------|---------------------|-------------------------------|---------------|
| From 8 to 12 | 35 x 35 25 x 50 | from 5.4 m/min to 10 m/min | 25 mm |



BEVELLING MACHINES

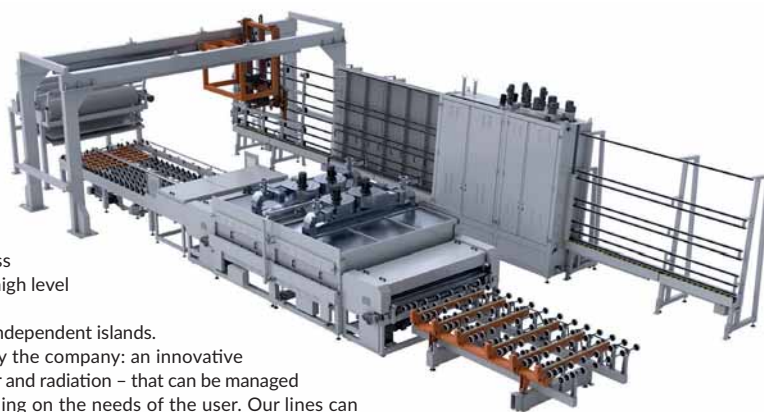
On the market since 1974, Bovone's range of straight-line beveling machines have, since then, been unbeaten for quality, performance and durability – the trend setter and reference point for the whole market, always a step ahead of competition. Bovone beveling machines are internationally recognized for their extreme reliability: they are, in fact, solid machines capable of ensuring minimum maintenance levels and reduced downtime. The finishing quality obtained with a Bovone machine is first-rate: this aspect is in synergy with the very fast execution times, the versatility of the models and the high customization potential work to guarantee the final customer higher productivity. The beveling machines, like the whole range of Bovone machines, are driven by dedicated software for simple and immediate use.

LAMINATING LINES

In the 1980's Bovone introduced its first laminated glass lines, which, right from the start, were already one of the most accurate and fastest lines manufactured, and also by far the most reliable – as always with Bovone products. The lines are:

- **Modular:** in fact, they are configured according to the customers' specific needs, who can also gradually integrate their line in different steps;
- **Versatile:** ensuring excellent performance both in the production of large numbers and for those in which high flexibility is required;
- **Reliable:** with minimal maintenance, they allow very short machine down-times; they guarantee high precision and quality of the finished glass sheets, thus increasing the productivity of the system together with the high level of automation;
- **Automated:** they can be integrated with robotic elements, configured in independent islands.

The lines are equipped with the latest generation of furnaces developed by the company: an innovative technology that integrates two heating systems – convection of forced hot air and radiation – that can be managed either completely independent from each other or in combination, depending on the needs of the user. Our lines can process 'sandwiches' of glass and PVB up to 80 mm and glass width from 1600 mm up to 3300 mm and length up to 6000 mm.

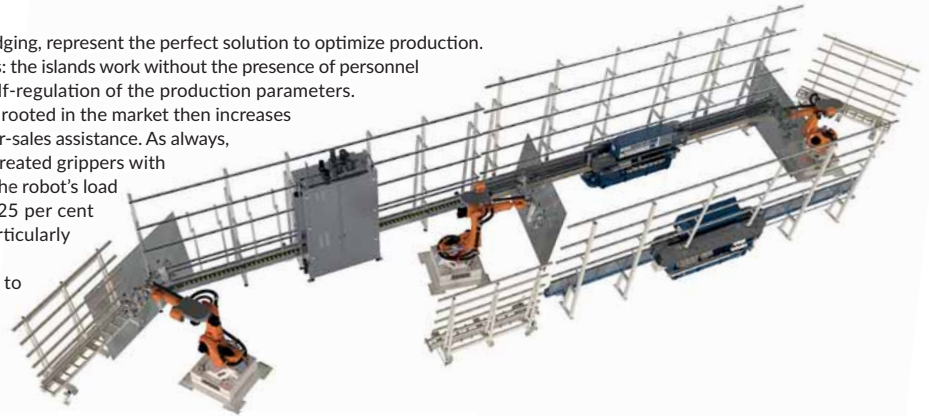


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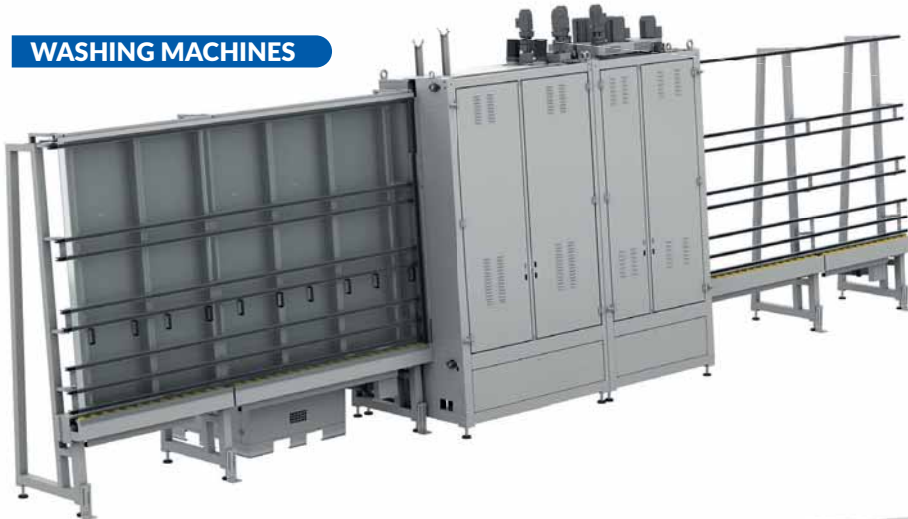
BRS

Bovone Robotic System, the automated islands for edging, represent the perfect solution to optimize production. The systems are compliant with Industry 4.0 protocols: the islands work without the presence of personnel and are fully connectable for the traceability and self-regulation of the production parameters. The use of robotic elements produced by companies rooted in the market then increases the levels of safety and reliability, also in terms of after-sales assistance. As always, with a view to safety and productivity, Bovone has created grippers with reduced weight and size that allow to weigh less on the robot's load capacity, improving performance in terms of time (25 per cent less) and energy used during the processing of particularly heavy plates.

The robots can be supplied stand-alone, applied to existing edgers or as customized robotic islands according to specific needs.



WASHING MACHINES



Bovone offers a full and complete range of glass washing machines for every need and purpose. The company's product range includes both vertical and horizontal washing machines that can be stand-alone or integrated with other machinery such as robotic systems, laminating or silvering lines, all with high quality, especially with regards to finishing - which is, as with all Bovone products, a fundamental strong point.

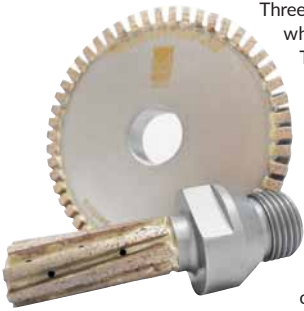


| | Speed | Maximum glass size | Minimum glass size | Glass thickness | Electrical power | Brushes | Air-knives |
|-------------|------------------------------|--------------------|--------------------|---------------------------|------------------|---------|-------------|
| 2LAS 30 | 1,5 m/min (optional 2 m/min) | 300 mm | 30 x 45 mm | 1,5 ÷ 8 (optional 4 ÷ 12) | 5 Kw | 2 | 2 ÷ hot air |
| 2LAS 130 VE | 4 m/min | 1300 mm | 80 x 150 mm | 2 ÷ 12 (optional 2 ÷ 19) | 9 Kw | 2 | 2 |
| BMW 1.6 | 0,4 ÷ 12 m/min | 1600 mm | 150 x 300 mm | 2 ÷ 25 mm | 19 ÷ 27 Kw | 2-3 | 2-3 |
| BMW 2.3 | 0,4 ÷ 12 m/min | 2300 mm | 250 x 390 mm | 3 ÷ 25 mm | 21 ÷ 40 Kw | 2-3 | 2-3 |
| BMW 2.6 | 0,4 ÷ 12 m/min | 2600 mm | 250 x 390 mm | 3 ÷ 25 mm | 23 ÷ 43 Kw | 2-3 | 2-3 |
| BMW 3.3 | 0,4 ÷ 12 m/min | 3300 mm | 250 x 470 mm | 3 ÷ 25 mm | 37 ÷ 60 Kw | 2-3 | 2-3 |



E-mail: sales@bovonediamond.com
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HIGH SPEED WHEELS FOR CNC MACHINES BY BDT



Three types of wheels are available: flat edge wheels, trapezoidal wheels and routers. The particular feature of the flat profile wheels is the new design of the sectors, which are smaller and set more closely together; as a result, they can reach speeds of 10 metres/minute, operating at 7,500 RPM. Trapezoidal wheels are made differently compared with traditional ones and have a different grit size. Accordingly, they can reach speeds of up to 8 metres/minute, again at 7,500 RPM.

New routers also feature the modified sector design and can reach speeds 50% higher than traditional ones, being estimated to operate at around 12,000 RPM.

GOLDNET ROUTERS FOR LAMINATED GLASS OR HIGH THICKNESSES - BDT PATENTED



- Less Chips And Breakages
- Even Wearing
- Noiseless
- No Vibrations
- High Cutting Power
- Longer Life

CUP RESIN BOND WHEELS

Cup resin bond wheels for bevelling and edging machines are supplied with band 10-12-15-20 mm and with different band thicknesses and can be continuous, open segments or closed segments.

Customer can also ask for standard wheel thickness or, to improve life, can find other two types with higher diamond band. We think that the advantage of finding by only one supplier so many kinds of wheels and the possibility of asking for special tools for special production is very important, giving the opportunity of having a very high quality of the final product.

ARRIS POLISHING WHEELS - MADE IN BDT

Our range is available for all machines in the market equipped with these tools. Two kinds are offered: wheel SD and wheel CD.

Diameter 150mm and 100mm. Wheel SD: it is suitable for arris processing without diamond wheels.

Wheel CD: it is suitable for arris polishing after diamond wheels.

The wheels diameter 150mm are mounted on aluminum plate granting maximum rigidity and duration of the geometric tolerances.

These characteristics are fundamental for the high performances of the wheels in terms of life and process quality.



CUP DIAMOND METAL BOND WHEELS AND PERIPHERAL WHEELS FOR ALL BEVELLING AND EDGING MACHINES



BDT produces wheels for all machines for flat glass working.

The cup metal bond wheels for bevelling and edging machines have diamond band from 4 to 20 mm and the band is continuous or segmented, open or closed segments.

The peripheral wheels for bevelling machines, edging machines and double edgers are produced in diameters going from 100 to 200 mm, with different shapes and grits accordingly to their position on the spindle.

Also in this case we can supply special wheels on request.





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GEA

3-4-AXIS HORIZONTAL MACHINING CENTER

3 or 4-axis (optional) Numerically Controlled machining center to machine both thin and thick flat glass as well as laminated glass and bullet-proof glass. GEA can perform all types of grinding, polishing, drilling, milling, sawing with diamond blade, V-Grooving, engraving, and 5° bevelling.

- gantry system on the Y-Axis provides the bridge motion via two brushless servo motors synchronized by the Numeric Control, in order to ensure extreme accuracy by reducing positioning errors caused by mechanical elasticity
- large duraluminum work surface. The 780 mm worktable height makes it easier to load and unload
- monoblock, ribbed, electrically welded, and stress relieved ultra-thick steel base guarantees sturdiness and rigidity for difficult machining work and the longevity of the machine
- pre-setting is integrated into the tool magazine
- dynamic compensation of the polishing wheels for excellent machining quality



| | | |
|----------------------------|--|--|
| X AXIS STROKE | 3800 mm | |
| Y AXIS STROKE | 2550 mm | |
| Z AXIS STROKE | 420 mm | |
| MAXIMUM WORKABLE PART SIZE | 3700 x 2000 mm | |
| ROTARY AXIS (OPTIONAL) | C = 360° stepless | |
| TOOL CHANGE STATIONS | 12 ÷ 120 | |
| ELECTROSPINDLE | 13,5 KW (S1) - 21 KW (S6) 0 ÷ 15000 rpm | 30 KW (S1) - 36 KW (S6) 0 ÷ 12000 rpm |



| | |
|------------------------|--|
| X-AXIS STROKE | 3450 mm |
| Y-AXIS STROKE | 1800 mm |
| Z-AXIS STROKE | 350 mm |
| ROTARY AXIS (OPTIONAL) | 360° continuous |
| TOOL CHANGE POSITIONS | 13 + 13 |
| ELECTROSPINDLE | 11,5 KW 0 ÷ 12000 rpm ISO 40 18.5 Nm 6000 rpm |

ELECTA

3-4-AXIS HORIZONTAL MACHINING CENTER

CMS electa is the new 3- or 4-axis (optional) CNC machining center for processing flat glass, whether thick, thin, laminated or bulletproof. CMS electa features **the smallest footprint and the largest work area in its category**, and can perform many types of machining: the 3-axis version performs grinding, edge polishing, drilling and milling, while the 4-axis version can also perform cup wheel polishing, diamond disc cutting, engraving and 5° chamfering.

The high inertia and thickness of the **exclusive Metal Synthetic Technology (MST) worktable**, which replaces the conventional aluminum worktable, dampens vibrations and helps to improve the quality of the machined glass.

With a maximum axis speed of 72 m/min, CMS electa guarantees top performance and is the perfect machine to increase productivity since it performs high-speed grinding and can machine multiple workpieces on the same worktable.



SPEED

3-4 INTERPOLATED AXES MACHINING CENTER

- 3-4 axes (on request) Numerically Controlled machining center for the **processing of thin and thick flat glass sheets** for both laminated and bullet-proof glass. It carries out any type of **grinding, polishing, drilling, milling, cutting with disk, engraving, writing and 5° beveling operations.**
- Y-axis gantry system provides the crossbeam motion via two brushless motors synchronized by the NC, in order to ensure maximum accuracy and reduction in positioning errors that are due to mechanical elasticity
- large-sized duralluminum work surface. The above ground height of 500 mm facilitates access to the machine and makes the glass sheet loading/unloading operations easier
- **ultra-thick and normalized electrowelded ribbed steel monolithic base** ensures sturdiness and rigidity for heavy-duty operations and durability
- the machine is adaptable to any need due, thanks to the high configurability of the tool rack
- **dynamic compensation of the polishing wheel** for better machining quality
- working water collection tank integrated with the base which reduces the machine's footprint

| | | |
|-------------------------------|--|--|
| X AXIS STROKE | 3800 mm | |
| Y AXIS STROKE | 1740 ÷ 7200 mm (configurations with Y>7200mm are available) | |
| Z AXIS STROKE | 420 ÷ 900 mm | |
| MAXIMUM XY WORKING DIMENSIONS | It changes according to the configuration | |
| ROTATING AXIS (OPTIONAL) | C = 360° Stepless | |
| TOOL CHANGE POSITIONS | 12÷120 | |
| ELCTROSPINDLE | 13,5 KW (S1) - 21 KW (S6) 0 ÷ 15000 rpm | 30 KW (S1) - 36 KW (S6) 0÷12000 rpm |

MAXIMA

5-AXIS CNC MACHINING CENTER

5-axis interpolated Numerically Controlled machining center with automatic tool change for the working of flat glass sheets of all thicknesses and bent glass. It carries out all types of edge **grinding and polishing, arising, milling, cutting with disk, drilling, contouring, engraving, writing, variable-angle beveling operations and special machining.** It's the sturdiest machining center in the field, which makes it ideal for any type of working condition.

- **wide rotation of axes C (4th axis) and B (5th axis)** for the realization of 0-90° variable-angle beveling and dynamic variation of the bevel depth. The configuration with diamond disk is also available for straight and inclined cuts
- **Z-axis stroke from 460 to 900 mm for the most demanding works** on bullet-proof, military, aerospace and special glass sheets
- thanks to the high configurability of the machine, it is possible to process glass sheets in massive sizes



| | | |
|-------------------------------|--|--|
| X AXIS STROKE | 3800 mm | |
| Y AXIS STROKE | 2400÷7200 mm (configuration available Y>7200 mm) | |
| Z AXIS STROKE | 460÷900 mm | |
| MAXIMUM XY WORKING DIMENSIONS | It changes according to the configuration | |
| ROTATING AXES (OPTIONAL) | B = ± 100° / C = ± 270° (540°) | |
| TOOL CHANGE POSITION | 13÷180 + 1 blade holder Ø 500 mm | |
| ELECTROSPINDLE | 13,5 KW (S1) - 21 KW (S6) 0÷15000 rpm | 30 KW (S1) - 36 KW (S6) 0÷12000 rpm |



TAKTIKA

VERTICAL MACHINING CENTER

Taktika is the compact vertical machining center developed by CMS for the greatest flexibility in small spaces. The project was conceived for small and medium-sized glass factories that need to increase their efficiency, and is also ideal for larger companies that need the flexibility to manage small batches of glass.

The new Cms Active software has been designed to make the user interface more efficient and user-friendly than ever.

Taktika can perform seaming, grinding, polishing, milling and coaxial drilling; it can be used stand-alone or in line with a vertical washing machine to wash the glass immediately after processing.

| | |
|-------------------------------------|---|
| MAXIMUM WORKPIECE DIMENSIONS | 3000 x 2000 x 15 mm |
| MAXIMUM THROUGH-HOLE HEIGHT | 2500 mm |
| MINIMUM WORKPIECE DIMENSIONS | 320 x 220 x 4 mm |
| TOOL CHANGE STATIONS (FRONT + REAR) | 12 + 11 |
| MAXIMUM GRINDING WHEEL DIAMETER | 100 mm |
| MAXIMUM CORE DRILL BIT DIAMETER | 50 mm 2 in |
| ELECTROSPINDLE | 6 kW front head 6 kW rear head 12.000 rpm ISO 40 |



YPSOS

CNC VERTICAL MACHINING CENTER

Ypsos is the newest vertical machining center developed by CMS, ideal to process float and laminated glass sheets, entirely designed thanks to many decades of experience in the glass industry. This is the first and only vertical CNC machining center capable of grinding and polishing with two heads at the same time. This project was conceived to reach the best reliability ever in the vertical CNC category. The new software has been designed to make the user interface more efficient and intuitive than ever. Based on the configuration selected, Ypsos can carry out seaming, polished and industrial grinding, milling and coaxial drilling operations. This machine provides absolute accuracy and quality, accompanied by the classic benefits in terms of productivity and versatility given by the vertical machining process. Available in 3 standard sizes, it allows the processing of small and large-sized parts up to 6000x3300 mm max. (additional maximum processable sizes available upon request). Ypsos can be used as a stand-alone machine, in line with a drilling-milling machine or inside an insulating line.

| | |
|---------------------------------------|--------------------------|
| SHEET MAXIMUM LENGTH | 3.200 - 4.500 - 6.000 mm |
| SHEET MAXIMUM HEIGHT | 2.200 - 2.800 - 3.300 mm |
| SHEET MINIMUM LENGTH | 420 mm |
| SHEET MINIMUM HEIGHT | 270 mm |
| SHEET THICKNESS | 3÷30 mm |
| GRINDING WHEEL PACK MAXIMUM THICKNESS | 50 mm |

VERTEC

CNC VERTICAL DRILLING MACHINE

CNC vertical machine for **drilling, countersinking, milling and notching** operations on monolithic, laminated and Low-E glass.

- possibility to work both **rectangular and shaped glass** sheets (one rectilinear side required)
- **two coaxial opposed electrospindles** and tool cooling system with internal and external water, which enables a higher finishing and machining quality
- **two 9+9 stations** NC-controlled rotating tool crib installed on a carriage fixed to the electrospindle, ensure tool change operations in the shortest time
- **high-pressure water cushion** (patented)



| | |
|----------------------------|---------------------------|
| MAXIMUM WORKABLE LENGTH | 3200 - 4500 - 6000 mm |
| MAXIMUM WORKABLE HEIGHT | 2220 - 2600 - 3300 mm |
| MINIMUM WORKABLE DIMENSION | 420x180 mm |
| GLASS WORKABLE THICKNESS | 3 ÷ 30 mm |
| DRILLING BITS DIAMETER | 3 ÷ 70 mm |
| ELECTROSPINDLE | 3,7 KW (S1) - 4,4 KW (S6) |

AGIL TR

CUTTING TABLE

Agil tr is the **most compact and versatile** cutting table ever made by CMS.

It is a table that can automatically cut monolithic (float) glass sheets and semi-automatically cut laminated glass sheets thanks to the double-zero system.

- The table is equipped with **4 arms** for loading/unloading the sheets and a c-axis to perform both straight and shaped cuts.
- Easy to install and compact in size, it can cut large sheets up to 3810 mm x 2600 mm.
- The table can be equipped with an **automatic tool change** and a **low-e coating removal grinding wheel**, and a vinyl removal system.



| | |
|---|---------------------|
| MAX. WORKABLE SHEET DIMENSIONS | 3810 x 2600 mm |
| WORKABLE SHEET THICKNESS | 2 - 19 mm |
| MAXIMUM POSITIONING SPEED | 200 m/min |
| MAXIMUM ACCELERATION | 10 m/s ² |
| AXIS POSITIONING ACCURACY | ± 0,15 mm |
| STRAIGHT AND SHAPED CUT OPTIMISATION SOFTWARE | Yes |
| BREAKOUT BARS | 2+1 |
| MAXIMUM UNLOADABLE SHEET | 350 kg |
| WORKING SURFACE HEIGHT | 925 mm (-25 + 30) |

AURA

VERTICAL SEAMING MACHINE

aura is the vertical dry seaming machine specially developed to machine edges without the use of water (dry seaming). Aura can be used as a stand-alone machine, in line with a vertical washing machine and is **the perfect machine to be part of a double glazing line.**

Aura can seam monolithic, laminated or low-e treated glass. Aura is designed to meet the needs of customers who demand **ease of use, quick installation, reliability and low cost of system ownership.**

The operator loads the glass and starts the processing cycle, the machine automatically measures the incoming glass (height, length and thickness) and machines the edge. Aura also adapts its operating units to different thicknesses.



| | |
|----------------------------|--|
| MAXIMUM HEIGHT | 3845 mm with roller height 450 mm from the ground 4045 mm with roller height 650 mm from the ground |
| MAXIMUM LENGTH | 8250 mm (without additional modules) |
| MINIMUM SHEET HEIGHT | 240 mm |
| MAXIMUM SHEET HEIGHT | 2700 mm |
| MINIMUM SHEET LENGTH | 450 mm |
| MAXIMUM SHEET LENGTH | 4000 mm 6000 mm (with additional modules) |
| MACHINABLE THICKNESS RANGE | 4 - 22 mm |

PROXIMA

AUTOMATIC HORIZONTAL SEAMING MACHINE

The Cms proxima automatic horizontal seaming machine is the **ideal solution for all small-medium glass factories that need to venture into seaming with a modest investment.** This machine has been designed to be **combined with both tilting float glass cutting tables and laminated glass cutting tables.**

KEY BUYER BENEFITS

- Dry solution [operating cost savings]
- Installation and set-up in one day [savings and ease of use]
- Maximum length machinable in one pass: 2.6 m.
No limit with multiple passes [flexibility]

| | |
|--|----------------------|
| MACHINE DIMENSIONS | 765 x 3830, H1365 mm |
| WORKING HEIGHT | 880 - 980 mm |
| SHEET LENGTH MACHINABLE IN A SINGLE PASS | 2600 mm |
| MACHINABLE GLASS THICKNESS | 4 - 19 mm |
| SEAMING SPEED | 20 m/min |
| EXTRACTORS | 1 |
| DRY GRINDERS | 2 |



KART

AUTOMATIC LOADING SYSTEM

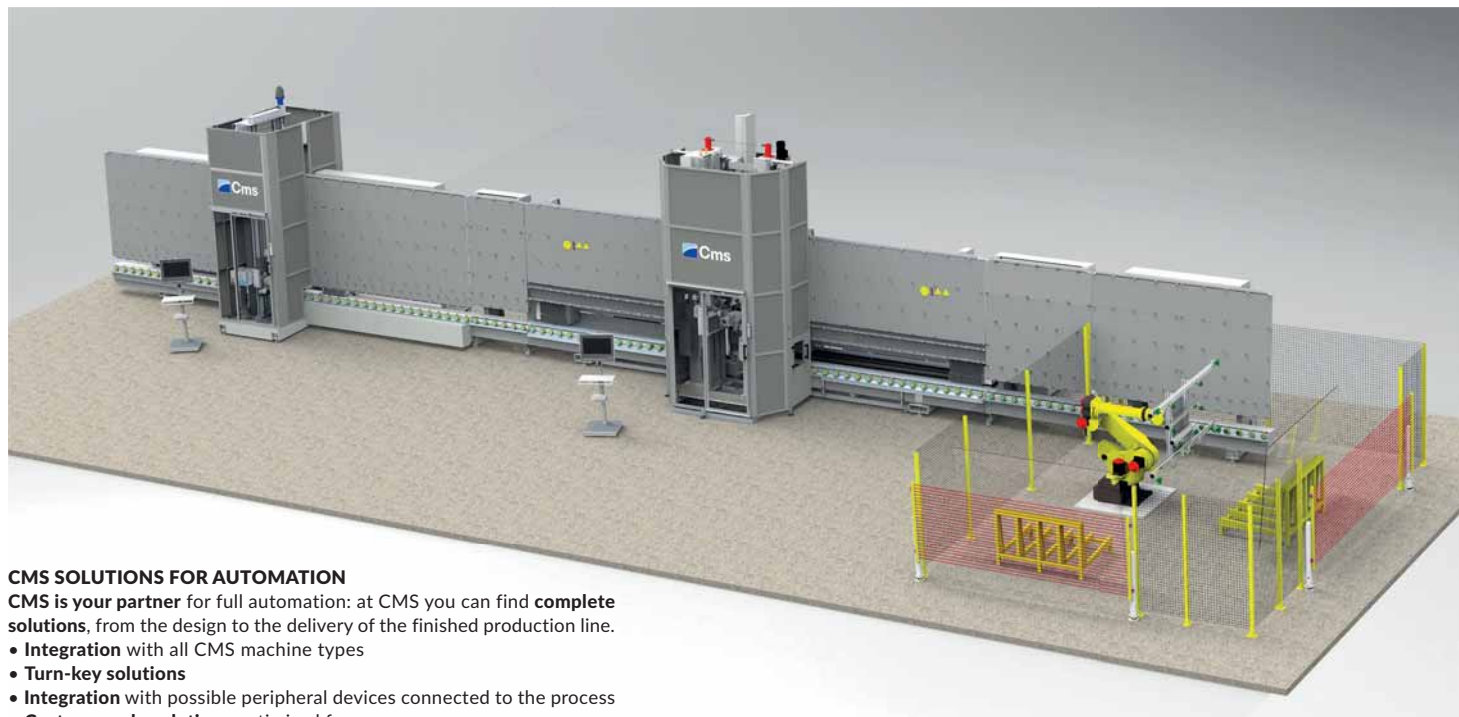
CMS Glass Technology offers a wide range of Kart model **loaders/unloaders for the automatic handling of glass sheets**. All such systems are easily **integrated into any straight line edger** (vertical or horizontal), machining centers. They enable the operator to carry out loading/unloading operations in **complete safety**, minimizing all risks of breakage and increasing productivity.

- the movements (approach, pick-up, lifting, tilting, release, etc.) are managed by a CMS designed PLC
- the glass sheet is picked up by a suction cup group connected to the vacuum circuit through a Venturi system or a liquid ring pump; according to the sheet dimensions, the software decides on the number of suction cups to use
- it is possible to load/unload two or more glass sheets simultaneously from butted rows and/or overlapping surfaces
- the (optional) brushless motors make movements smoother and faster
- they can be easily integrated into other manufacturers' plants

| MODEL | Max loading dimensions | Min Loading dimensions | Max loading weight |
|-------|------------------------|------------------------|--------------------|
| 50 | 2200x1200 mm | 300x200 mm | 50 kg |
| 150 | 3000x1600 mm | 300x200 mm | 150 kg |
| 200 | 4000x2200 mm | 500x200 mm | 200 kg |
| 400 | 4800X2800 mm | 500X200 mm | 400 kg |



AUTOMATION



CMS SOLUTIONS FOR AUTOMATION

CMS is your partner for full automation: at CMS you can find **complete solutions**, from the design to the delivery of the finished production line.

- **Integration** with all CMS machine types
- **Turn-key solutions**
- **Integration** with possible peripheral devices connected to the process
- **Custom-made solutions** optimised for your success

SMARTLINE

3- AND 5-AXIS WATER JET CUTTING SYSTEM

Smartline is designed to redefine industry standards of excellence by improving operating efficiency, while maintaining CMS' renowned reputation for unparalleled construction and working quality. It includes all the safety and performance features typical of CMS Waterjet machines, in a brand new, **innovative, and compact design**.

- The open frame structure with electric gantry and linear guides integrated in a sturdy tank allows an **easy access to the worktable**. Loading and removing material is quick and easy.
- All axes' motions are carried out through hardened and ground rack and pinion.
- The **thermowelded bellows provide complete protection of the guides** and the rack of x-axis from water and dust. On Y-axis, instead, the protection is guaranteed by a set of sheet metal panels.
- The steel structure undergoes an anti-rust treatment through sandblasting and ceramic painting, which results in a **higher resistance against corrosion**.
- The tank is set up for the installation of a **chain system for the exhausted removal**.



| MODEL | 2040 |
|--|-------------------------------------|
| X AXIS | 4000 mm |
| Y AXIS | 2000 mm |
| Z AXIS | 250 mm (150 mm with 5-axis head) |
| B AXIS | ±60° |
| SUPPORT PLANE | 4150x2080 mm |
| OVERALL DIMENSIONS WITH LIGHT BARRIERS | 5595x7400 mm |

PROLINE

HYDRO-ABRASIVE WATERJET CUTTING SYSTEM

The ultimate machine tool specifically conceived and designed with advanced technical solutions for the waterjet cutting technology, in order to achieve unmatched performance. Proline is built around a **stainless-steel frame ready for integration with the "Dredge"**, a fully automated and **maintenance free abrasive removal system**, an **automatic water level control** for submerged cutting. This innovative, easy configurable concept has not only the abrasive tank installed on-board, but also the electric servodriven high-pressure pump is integrated with the machine frame, a **big saving in terms of overall layout**. The overall machine structure, especially the rugged gantry system, offers unmatched rigidity and thus consistent cutting accuracy over time, thanks also to the ground helical rack and pinions, combined with high precision gearboxes.

The linear guides are protected by the innovative "Powder free" system composed of overlapping way covers, which ensures the highest protection against moisture, dirt and dust.

- **More versatility:** new models and extensive supply of accessories and standard arrangements for faster, less costly retrofits
- **More reliable:** NC and digital drivers for full control of the cutting parameters
- **More compact:** accessories integrated into the base structure for easy, fast installation and re-commissioning

| MODEL | 1730 | 2040 |
|-----------------------------|----------------|----------------|
| X AXIS STROKE (1 HEAD) | 3250 mm | 4250 mm |
| Y AXIS STROKE | 1700 mm | 2000 mm |
| Z AXIS STROKE (3-AXIS HEAD) | 300 mm | 300 mm |
| Z AXIS STROKE (5-AXIS HEAD) | 200 mm | 200 mm |
| C AXIS (5 AXIS ONLY) | Infinite | Infinite |
| B AXIS (5 AXIS ONLY) | ± 62° | ± 62° |
| XY AXIS RAPID SPEED | 40000 mm/min | 40000 mm/min |
| WORKTABLE SIZE | 3820 x 1920 mm | 4820 x 2220 mm |
| WORKTABLE LOAD CAPACITY | 1000 kg/m2 | 1000 kg/m2 |
| POSITION ACCURACY | ± 0,035 mm | ± 0,035 mm |
| POSITION REPEATABILITY | ± 0,025 mm | ± 0,025 mm |





CUGHER GLASS Srl

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J SERIES

The fully automatic silk-screen printing machine is composed of an entry/pre- alignment conveyor, the printing machine body and an exit synchronized conveyor. The machine has a firm structure with the printing table made by a specially treated aluminum and it is equipped with a belt transport system and an auto-centering. It is ideal for glasses of medium and large dimensions, typical of Automotive and Architectural sectors.



Glass size: from 400x300 mm to 6000x3200 mm

G SERIES

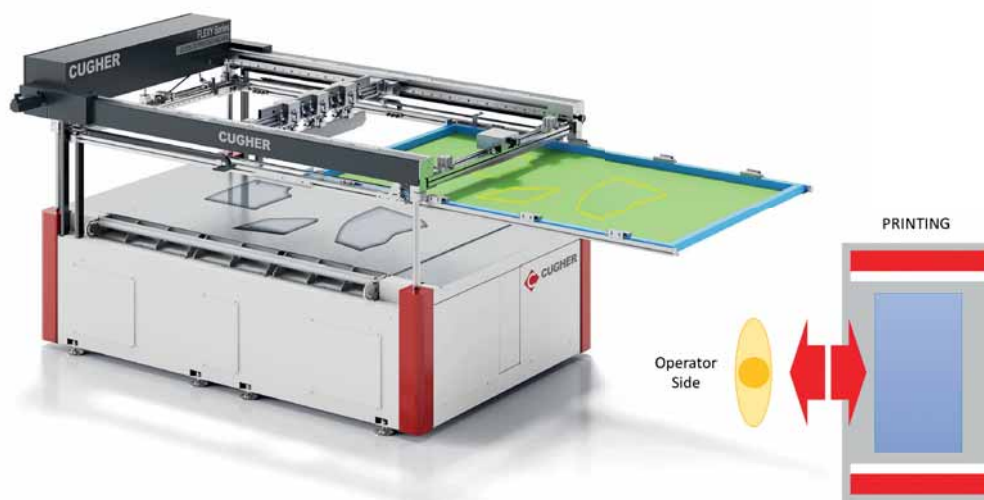
The printing machine transports the glasses through a shuttle with two independent cross shaped holders and centring out of the printing table. The system consists in one cross shaped holder with a vacuum cups system. The glass is collected by the walking beam while it is still in the centring device of the inlet conveyor; thanks to this operation it is possible to transport the glass with great accuracy. This solution enables reaching the maximum speed of the printing process for glasses with small and medium dimensions, guaranteeing high productivity required in the Automotive sector.

Glass size: from 250x150 mm to 2500x1600 mm



FLEXY SERIES

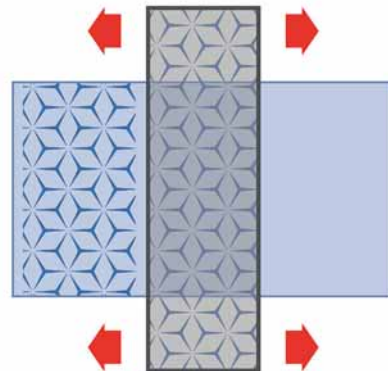
The printing machine manages multiple glasses type (thin, standard, coated, polycarbonate) and it is extremely versatile for small and different lots. The stainless-steel magnetic table, worked with micro holes, is equipped with vacuum and blow system for easy nesting. The Flexy Series is a stand-alone machine with manual loading/unloading and finds application in all type of sectors. Max glass dimensions 1300x2000 mm - Min. printing size 200x200 mm



SKETCH SERIES

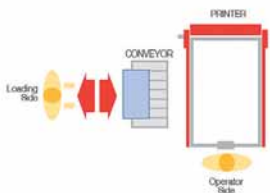
The printing machine is completely stand-alone and ready for in line operations. The frame is usable for several glass dimensions with reference on left-front side and the movable screen allows to personalize the print. In fact the image can be printed on different parts of the glass. It is Ideal for interior design sector, in particular for shower doors.

From small to big glasses with rectangular shape – from 500×200 mm to a maximum of 2700×1600 mm

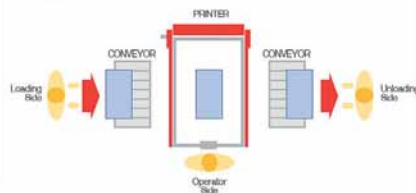


Stand-Alone

Version 1
Manual loading and unloading, on the same side.

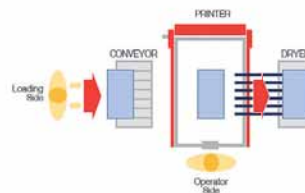


Version 2
Manual loading upstream, manual unloading downstream.



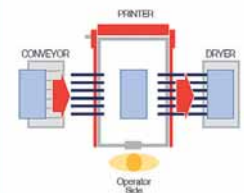
Semi-Automatic

Manual loading of the glass on the loading side. Automatic rear discharge with transport belts.



Full-Automatic

Automatic glass loading and unloading by a belt transportation system.



COMPACT SERIES

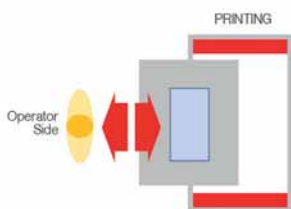
The printing machine has the flexibility to be used as a stand-Alone printing machine or to become the heart of a full automatic printing line. A real solution for the high productivity demands, being, at the same time easy to use. The Compact Series is able to satisfy specific production needs and represents the perfect solution for huge batches and squared/rectangular glasses that have to be printed quickly and precisely, characteristic of home appliance sector.

Glass size: from 100x35 mm to 1300×700 mm



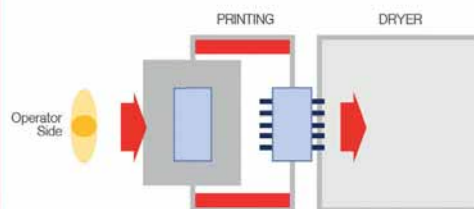
Stand-Alone

Manual loading and unloading, on the operator side, with extractable printing table.



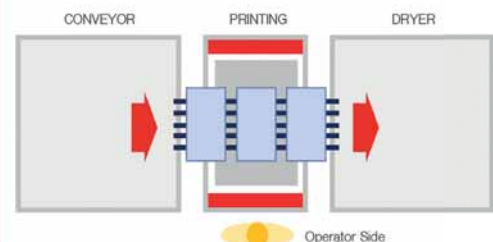
Semi-Automatic

Manual loading and unloading of the glass, on the operator side, with extractable printing table. Automatic rear discharge with transport belts.



Full-Automatic

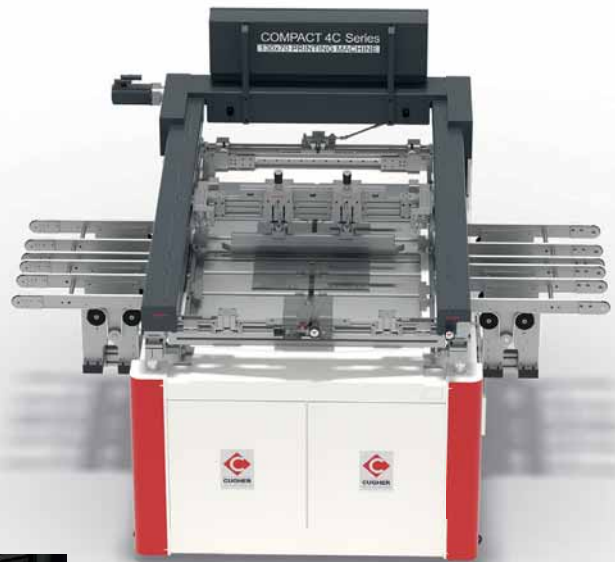
Automatic glass loading and unloading by a belt transportation system.



COMPACT 4C

The fully automatic Compact 4C screen printing machine is the evolution of the consolidated Compact Series, able to process bigger squared and rectangular glasses for cooktops and glass for household appliances, also drilled, ensuring high productivity, thanks to its 4 columns which sustain wider printing head. The printing head is able to accommodate the E2E system for printing right up to the edge and the frame can be extracted for cleaning without losing the register.

Glass Size: from 150×50 mm – to 1300×700 mm



LOGO PRINT STATION

The Logo Print Station is a special equipment composed by a booking conveyor and a logo print system that, working jointly, are able to center and print the logo on the underneath glass. The movement is given by pneumatic linear guide. It is possible to adjust the squeegee and flood bar speed independently. The up and down vertical movements of the Squeegee /Flood bar group are obtained by dedicated cylinder. The Logo Print Station is equipped with its own PLC.

DRYERS

Cugher Dryers (IR, UV or combined) with specific features and flexibility are able to satisfy both silk screen printing and digital printing on glass. Indeed, adapting air recirculation, dryers can accurately dry ink thickness from 15 to 100 microns. Moreover, dryers are able to accelerate the drying process through the efficient transfer of energy to the ink/enamel and the capability of evacuating vapours generated by solvents during the drying process.



www.cugher.com

SYMPHONIA

The Automated Harps Rack System is the ideal glass handling solution for small and medium glassworks. Symphonia is created to facilitate the loading and/or the unloading of glass sheets onto vertical production lines, such as those for insulating glass, for glass dimensions up to 3000 mm x 1500 mm. The solution enables:

- Eliminate the need for manual loading/unloading
- Modularity: it includes as many positions as the production needs of each customer
- Customized engineering as per the available space in the warehouse and the processed glass dimensions



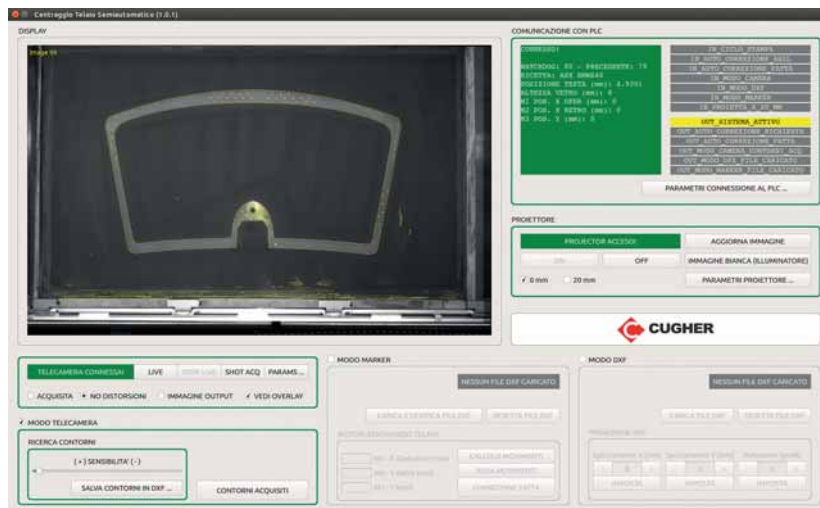
VISION SYSTEMS

AUTOMATIC GLASS QUALITY INSPECTION VISION SYSTEM

The system, typically installed downstream the washing machine, is able to scan the whole glass and detect any defect present on the raw glass such as scratches, breakages, air bubbles, chips, contaminations, water drops, wet edges.

AUTOMATIC PRINT QUALITY VISION SYSTEM

The system, installed immediately after the printing machine, recognizes any "slaving" or "widening" of the design's details due to an excess of ink coming from the screen.

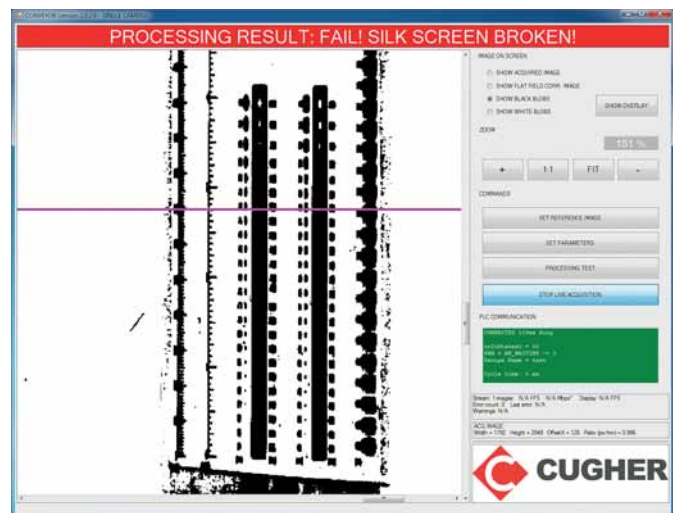


AUTOMATIC SCREEN REGISTRATION SYSTEM WITH CAMERAS

The system allows to automate the register of the screen with the glass to be printed, performing a complete model changeover in an extremely short time.

BROKEN SCREEN DETECTION SYSTEM

This unit is positioned just downstream the printing machine; it detects automatically if there is a broken screen, by controlling the presence of ink spot on the lower surface of the glass.





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Vision Inspection Solutions for Flat Glass

CUTTING LINES SOLUTIONS

From the very initial stages the system has been conceived to be versatile and flexible enough to easily adapt to any cutting process without needing any alteration.

OPT inspects glass sheets during the transit from the loader to the cutting. The software elaborates the image, detects its defects (bubbles and inclusions) and excludes those of acceptable dimension. Clients have full control on the minimal dimension parameters they wish to assign to defects.

OPT makes it possible to waste just a limited area around the defect, instead of the whole sheet. Only sheets without defects will proceed with further processing. This will reduce machinery wear, the whole processing time as well as the need to cut again defective sheets.

ADVANTAGES

Detects structural defects such as bubbles and inclusions in monolithic and laminated glass

Compatible with the cutting table for fully automatic management

Checks unwashed glass sheets before starting the cutting process

Reduces the glass refuse area because defects are placed in the shrinkage areas provided by the cutting pattern of each sheet

Saves energy and prevents excess machinery wear because non-compliant sheets will not be processed
 Rationalizes cycle time thanks to reduced waste on the line and increased time saved for their management



TECHNICAL FEATURES

- Can work with any kind of transparent glass, apart from sandblasted, mirrored, frosted sheets.
- Usable with both regular and jumbo format, but also, with different various widths.

- Images resolution: 0,2 mm\pixel.
- Minimum dimension of detectable defects: 0,4 mm.

DETECTABLE DEFECTS

Structural defects (bubbles, inclusions)
 Scratches that affect the glass surface

IG LINES SOLUTIONS

Deltamax is constantly improving its solutions which have multiplied to meet the different needs over the time and which can now be installed in various places along the production line.

The extreme care devoted to the design phase has made it possible to combine simplicity of installation, maintenance and use with a high level of customization. System parameters can be programmed according to the desired quality level of defect evaluation, so that every scanner becomes an invaluable support to production quality improvement.

GLASSINSPECTOR

Over 300 installations across the world are proof of the versatility and reliability of GLASSINSPECTOR. Developed in 2007, this technology has constantly evolved to meet different needs, thereby improving its defects detection performance to the highest levels, for example at the time of replacing the only component subject to wear, the lighting unit.

This is the result of Deltamax's mission to seek an innovative solution that could also be applied to previously installed products
 Easy to install, easy to use, easy to maintain
 GlassInspector is the easiest way to start working with an automatic system for glass control to improve the whole production quality.

TECHNICAL FEATURES

- Can work with any kind of transparent glass (including low-e, selective and colored paste glass).
- Can inspect any glass shape.
- Image resolution: 0,2mm/pixel.
- Minimum dimension for defect detection: 0,4mm/ pixel.
- Maximum thickness for defect detection: 50mm.
- Maximum line speed: 60mt/min.

DETECTABLE DEFECTS

Glass defects: bubbles, inclusions, knots
 Process defects: scratches, stains, prints
 Coating defects: holes, abrasions, scratches, burns



- **Q+**
Released in 2019, Q+ represents a considerable step forward in the world of glass inspection systems, as it has defined a new standard in the field of flat glass defects detection.

ADVANTAGES (as compared with GlassInspector)

- More precise and sensitive in the detection of defects
- Double inspection channel with a single camera array that guarantees performance at an affordable price

TECHNICAL FEATURES

- Integrates two systems in one solution, by improving the standard system with a second inspection channel.
- High precision in detecting the most difficult defects such as halos, slight stains, roller scrapes on tempered glass, thin scratches.
- Makes it possible to customize parameters for each defect class.

- Does not slow down production thanks to the new 64-bit technology.
- The Production Analyzer software enables the processing of the data collected by the scanner to obtain production statistics, personalized reports and an insight into the different defect categories identified.

DETECTABLE DEFECTS

(in addition to the defects detectable with GlassInspector)

- Halos cause by water / incomplete drying
- Halos caused by the tempering process
- Prints of suckers in laminated glass
- Remains from insulated tape, oils or other substances.
- Prints or light stains
- Thin scratches

- **IGU SCANNER**

Any manufacturing company's goal is to certify the quality of a finished product and of the whole production line before delivering it to the client. The entire IG production sector has undergone incredible innovation which has resulted in a great variety of finished products, made of different types of glass and of spacers. Thanks to the IGU Scanner, Deltamax can offer a versatile solution for the control of single, double and triple glazing.

CONTROLS CARRIED OUT

Visual defects in the transparent area, or detection of bubbles, inclusions, scratches, dirt, remains of various kinds including butyl
Correctness of the spacer position, i.e. detection of bulging or out of square
Correctness in the laying of the Georgian bars, comparison with the drawing for the verification of the position as well as of the offset between the bars and the offset between the single glazing.

FLAT GLASS CONTROL SOLUTIONS

A standard but highly customizable solution. It may sound like a contradiction but that's the perfect description of EVO. The system can easily adapt to various defect detection needs by changing the number and type of video cameras or lighting unit while at the same time being based on a reliable and well-tested software enabling clients to choose among different quality levels by setting different parameters. Thanks to the interface with the production line and with the different ERP software, EVO is fully integrated with the production line thereby improving its automation.

ADVANTAGES

The scalability guaranteed by the system enables clients to obtain the best quality/price ratio, while still giving the possibility of a hardware and software upgrade to increase performance and functionalities at a later stage.

TECHNICAL FEATURES

- Defect detection on glass, coating, printing, sheet edges.
- Highly customizable: clients can set different levels of quality and control parameters.
- High adaptable to any production line, be it horizontal or vertical, small in volume and with minimal maintenance.
- Can interface with the production line e.g., can manage an automatic discard system of non-compliant products.
- Can save results and defect images.
- Can generate personalized statistics and production reports.
- Offers a full support and software update service.

- **DEFECTS DETECTION**

The high customization degree permit to adapt the sensitivity of the control, changing both the type and/or the minimum dimension of the detectable defects. Thanks to this characteristic, Evo could be installed on any processing line to improve the quality of each process, from lamination to tempering.

- **DIMENSIONAL CONTROL**

The increasing use of glass in various sectors with an increasing demands of non-conventional shapes has resulted in more and more meticulous processing of the sheets. Particular outlines request high levels of precision in processing if they are to become part of complex products. The speed of modern production together with the peculiarity of processing often make human control impossible to perform, thereby we must rely on automated systems.

CONTROLS CARRIED OUT

- External dimension control
- Shape control
- Hole position and diameter control
- Processing control



- **PRINTING CONTROL**

The use of glass in particular sectors, such as the automotive, household appliance or interior design industries, has dramatically increased the use of serigraph or digital printing in glass production processes. A careful and precise quality control is a time-demanding process which is hardly compatible with the cycle times of the production process and requires the use of optical systems enabling the detection of repetitive irregularities due to machinery wear or damage

BLACK BAND CONTROL

- Completeness
- Position and rotation
- Scratches, void or lack of ink detection

LOGO CONTROL

- Completeness
- Position and rotation
- Character legibility
- Presence of traces
- Drop of ink in the transparent area



EDGETECH EUROPE GMBH

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THE ADVANTAGES OF THE SUPER SPACER®

- low thermal conductivity
- fast dew point drop
- durable edge seal, continuous vapour barrier at corners
- moisture-adsorbing, flexible foam matrix
- high desiccant content adsorbs more moisture than two-sided and generally also more than four-sided filled conventional systems
- no chemical fogging*
- various widths between 3.2 and 32mm
- new colour variants
- high-quality silicone for superior resistance to UV-light and oxidation
- very good gas-loss rate values according to EN 1279 part 3
- optimum values for energy efficiency (Psi-Values up to 0.029 W/mK)
- enhanced comfort and well-being near windows
- excellent condensation resistance, shape retention and colour stability
- excellent durability for sustainable performance
- higher productivity through ease of processing (only three process steps)
- North America ASTM E2188/E2189/E2190
- Passive House ph A+ certificate for Arctic Climate
- Europe EN 1279
- Canada CGSB 12.8
- CEKAL - certified for France
- RAL Quality Label
- ISO 5001 Energy Management
- ISO 9001 Quality Management
- ISO 14001 Environmental Management
- P1 Industry standard USA

* safe up to approx. +80°C, higher depending on the test method





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Arrissing Machine

ART. EG ARRISSING MACHINE

The vertical arrissing machines series Art. EG remove the sharp edges of glass sheets by eliminating irregularities, ensuring safe and smooth finishes. Art. EG significantly increases the productivity of arrissing operations as is equipped with **two operating heads**, that are capable of working simultaneously on two different sheets of glass, or by synchronizing both operating heads onto one sheet of glass.

The **"self-learning"** mode automatically acquires the dimensions for

| | EG04020HT | EG04025HT | EG05028HT | EG06033HT |
|------------------------------------|-----------|-----------|-----------|-----------|
| Height (mm) | 3.670 | 4.170 | 4.470 | 4.970 |
| Length (mm) | 9.650 | 9.650 | 9.650 | 9.650 |
| Depth (mm) | 3.260 | 3.260 | 3.260 | 3.260 |
| MAX glass length (mm) | 4.000 | 4.000 | 5.000 | 6.000 |
| MAX glass height (mm) | 2.000 | 2.500 | 2.800 | 3.300 |
| MAX glass weight (kg/linear meter) | 200 | | | |



the square shapes, while a separate device measures the thickness of the glass being processed. During the arrissing process, **the double suction cup carriages** secure the sheets of glass and move them forward. Depending on the sizes of the glass sheets being processed, the suction cup carriages automatically move to the correct position.

The presence of two independent suction cup carriages allows Art. EG to **reduce processing cycle time, guaranteeing high productivity.**

Art. EG can also process different shapes of glass sheets. (shape must be linear, such as triangles, trapezium, etc.). Art. EG is equipped with two operating heads with **"V" shape diamond tools ø 200 mm.**

The arrissing machine is able to process **glass thickness between 3 and 21 mm with processing speed up to 300 mm/sec.**

Edging -Drilling -Milling Line

ART. EM EDGING MACHINE

The edging machine Art. EM, one of the most appreciated of the Forel range, is for the edge processing of monolithic and laminated glass sheets.

The machine can perform three different processing operations: arrissing, grinding, polishing. Thanks to the different technological measures used, Art. EM guarantees total stability and high processing speed during the different processes. It can also process low-E glass without damaging the coating.

The operating head of the **Art. EM** edging machine is equipped with a **patented system for the localized holding of the glass sheets.**

The device consists of **two self-adjusting glass-pressing wheels** that rest on the glass sheet and hold it in place. The system guarantees a perfect hold, centring with respect to the tool, as well as the absence of vibrations during processing. Thanks to this device, **Art. EM** offers precise processing even when the glass sheet is not perfectly flat.

The **Art. EM** vertical edge processing machine is equipped with an exclusive feeler that controls the edge of the sheet locally during processing, 'guiding' the grinding wheel.

It can therefore operate in **dynamic self-learning mode for rectangular glass**, guaranteeing consistently uniform results in both arrissing and edging.

The edging machine is equipped with a pre-setting system that controls consumption and the contact of the tool.

| | EM04020HT | EM04525HT | EM05028HT | EM06033HT | EM09033HT |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Height (mm) | 4.000 | 4.000 | 4.300 | 4.800 | 4.800 |
| Length (mm) | 10.800 | 10.800 | 10.800 | 11.900 | 20.170 |
| Depth (mm) | 2.600 | 2.600 | 2.600 | 2.600 | 3.180 |
| MAX glass length (mm) | 4.000 | 4.500 | 5.000 | 6.000 | 9.000 |
| MAX glass height (mm) | 2.000 | 2.500 | 2.800 | 3.300 | 3.300 |
| MAX glass weight (kg/linear meter) | 200 | 200 | 200 | 200 | 200 |



ART. DM DRILLING AND MILLING MACHINE

Enriched with specific features to guarantee precision and stability, the vertical drilling and milling machine art. DM represents an irreplaceable resource, both for stand-alone use and in line with an edging machine art. EM. The quality of processing of the glass sheets depends mostly on the stability of the glass while the various tools are being used. For this reason, the art. DM is equipped with **two opposite operating heads (which are independent and equipped with an automatic tool change system, with 6 rear positions + 8 front positions) and two exclusive suction cups systems**, both patented. The first group of **fixed suction cups** offers a strong grip on the glass sheet, while a



| | DM04020HT | DM04525HT | DM05028HT | DM06033HT | DM09033HT |
|------------------------------------|----------------------------------|-----------|-----------|-----------|-----------|
| Height (mm) | 3.950 | 3.950 | 4.250 | 4.750 | 4.750 |
| Length (mm) | 12.085 | 12.085 | 13.185 | 15.085 | 21.920 |
| Depth (mm) | 3.500 | 3.500 | 3.500 | 3.500 | 3.450 |
| MAX glass length (mm) | 4.000 | 4.500 | 5.000 | 6.000 | 9.000 |
| MAX glass height (mm) | 2.000 | 2.500 | 2.800 | 3.300 | 3.300 |
| MAX glass weight (kg/linear meter) | 200 | | | | |
| Automatic tools change | 8 tools (front) + 6 tools (rear) | | | | |

second group of smaller **adjustable suction cups** offers greater stability close to the processing tools. These suction cups can be positioned differently depending on needs.

An additional system of suction cups can be applied directly on the rear spindle. In addition to ensuring greater stability during drilling and milling, the rear suction cup group holds the cuts and releases them in the bottom tank. Alternatively, a **buffer** can be set in contrast to the tool for the execution of particular processing operations. This tool can be applied **both on the rear spindle and on the front spindle**.

ART. EM-DM COMBINATION

Art. DM vertical drilling and milling machine can work together with the **Art. EM** vertical edging machine. This configuration, by far one of Forel's most popular solutions, combines the **arrising, rough or polished edging, drilling and milling** processes in a single line. The line can be completed with an Art. VVV vertical washing machine. As well as demonstrably improving the quality of the finished product, spreading the workload of edge processing over more machineries also over offers significantly better productivity than other solutions: indeed, while a glass sheet is being grinded or polished, another one is already being drilled and another one is being washed.



Sorting System

ART. SS SORTING SYSTEM

The **Art. SS Sorting System** is the complete solution for the automation of the handling, storage and reordering of products in glass factories.

The **Art. SS Sorting System** consists of highly customizable handling and sorting units.

Its modularity allows it to adapt to the specific needs of glass factories. However, it is not just a matter of 'moving' the glass sheets: **Art. SS organizes and manages the progression of outgoing pieces** depending on the work programs (both previous and subsequent lines), contributing immediately in terms of productivity, speed and efficiency. Made up of glass sheet handling shuttles and storage units, the Sorting System solves the problem of so-called 'bottlenecks'.

In fact, different production lines often have different production times: thanks to its automated storage system, **Art. SS** guarantees order within the glass factory and allows to **optimize available space**.

Several advantages are obtained by decreasing manual **handling** of the glass sheets in favour of **automated** handling:

- **more rapid flow**, with time saving in supplying processing lines.
- **less risk of breakage or damage**.
- reduction of **waste**.
- **fewer risks for operators**.

The installation of the Sorting System results in a clear improvement in the order and efficiency of glass factories.

In fact, the Sorting System assigns a **unique ID (identification number)** to all glass sheets: **the sheets are constantly tracked, localised and managed according to the program**. The position of each single sheet can be monitored at any time from a PC station and the progress of each single order is therefore always known.



| | SS04028HT | SS05028HT | SS05033HT |
|------------------------------------|-----------|-----------|-----------|
| Shuttle height (mm) | 3.570 | 3.570 | 4.070 |
| Shuttle length (mm) | 4.200 | 5.270 | 5.270 |
| MAX glass length (mm) | 4000 | 5000 | 5000 |
| MAX glass height (mm) | 2800 | 2800 | 3300 |
| MAX glass weight (kg/linear meter) | 200 | | |

Vertical Cutting For Laminated Glass

ART. VC VERTICAL CUTTING LINE FOR LAMINATED GLASS

The vertical cutting line for laminated glass Art. VC combines high productivity and excellent quality: equipped with two cutting bridges and an automatic sheet rotating element, it has been designed to process Jumbo size sheets, optimizing cutting on X, Y, Z axes. The Art. VC offers precise, fast and safe processing. During cutting, the sheet remains in a vertical position throughout the duration of the production cycle, for high productivity in a reduced space. Cutting optimization is elaborated by means of a special software that reorganizes data, speeding up processing and assisting operators.

The line offers absolute precision, showing to be a true top product for the cutting of laminated glass. Each of the two cutting bridges has **two opposite ripping units** for the scoring of the glass and two breaking bars (front and rear), to also allow the uniform opening of the sheet along its

| | VC04533HT | VC06033HT |
|-----------------------|------------------------|-----------|
| Height (mm) | 5500 | 7000 |
| Length (kg) | 26000 | 26000 |
| MAX glass length (mm) | 6000 | |
| MAX glass height (mm) | 3300 | |
| MAX glass thickness | from 6,3 mm to 20,5 mm | |



entire length. In the case of Low-E glass, the cutting bridges can also be equipped with a **special coating removal system**. After scoring, the two pieces of the sheet are pulled, uncovering the PVB film. A **special infrared emitter** heats and softens the PVB film without heating the glass. A **patented motorized drawing system** totally or partially detaches the two panes. In the case of thick interlayer, a blade can also operate.

COMPLEMENTARY EQUIPMENT

The art. VC cutting line can be combined with:

- The automatic stock selector unit **Art. ST** has been developed for a quick and safe handling of the Jumbo size glass sheets, up to 12 tons each one. The shuttle is also equipped with a clamping system for the glass packs, allowing fast and safe positioning. Art. ST is equipped with an automatic glass storage with multiple racks.
- **Art. VL** automatic glass loader manages large size sheets, up to Jumbo size (6,000 x 3,300 mm).
- **Art. TT** tilting table at the end of the line.

IG Lines

The extensive choice of insulating glass solutions is the pride of the Forel range. Versatile and configurable to cater to a wide variety of needs, these machines are the result of over 45 years of research and development in this sector. Boasting a host of exclusive, patented technological solutions, Forel's products are a strategic choice, helping businesses attain the highest possible productivity and process quality. Forel offers four different series of solutions for insulating glass production: 'Essential', 'High Tech', 'No Limits' and 'High Speed'.

THE ESSENTIAL IG LINE

The Essential IG line is mainly designed for the production of double- and triple insulating glass units, with sizes, thicknesses and conveying weight capacity suited to residential architecture. This range consists of Forel's classic offering of machines for the industrial production of insulating glass. Designed to offer Forel quality in a version focused on a specific goal: IG units in commonly-used sizes, with rigid or flexible spacers. Compact but still with outstanding performances, this is the ideal solution for standardised production. The line is capable

| | |
|----------------------------------|--------------------------|
| MAX glass length (mm) | 4.000 |
| MAX glass height (mm) | 2.500 |
| IG unit thickness (mm) | 65 |
| IG unit weight (kg/linear meter) | 200 |
| Number of chambers | up to 2 (triple glazing) |
| Spacer | rigid/flexible |
| Gas filled | argon |
| Sealing products | up to 2 |



of working with individual glass sheets of up to 4.000 mm length and 2.500 mm height, weighing up to 200 kg/linear meter. It can also process up to two chambers and using up to two different sealing products.

THE HIGH TECH IG LINE

The cornerstone of Forel's product range for insulating glass. The result of Forel's decades of experience in this field, the "High Tech" range is complemented by a choice of exclusive devices and systems for work with offset and shaped glass

| | |
|----------------------------------|---|
| MAX glass length (mm) | 6.000 |
| MAX glass height (mm) | 3.300 |
| IG unit thickness (mm) | 100 |
| IG unit weight (kg/linear meter) | 400 |
| Number of chambers | up to 3 (quadruple glazing) |
| Spacer | rigid or flexible |
| Gas filled | argon and krypton |
| Stepped unit | up to 100 mm (leading and lower edge) up to 300 mm (trailing and upper edge) |
| Sealing products | up to 3 |



sheets, as well as for double, triple and quadruple IG units. This line can process assembled glass units up to 6.000 x 3.300 mm in size, weighing up to 400 kg per linear metre (assembled panel), and thicknesses up to 100 mm. Equipped with a flat plate coupling press with gas filling function (argon/krypton) and sealing machines, the High Tech line can process rigid or flexible spacers and can use up to three different sealing products. Special technology also enable the management of possible curvatures of the glass sheets.

THE NO-LIMITS IG LINE

The "No Limits" IG line meets all requisits for the ultra large sizes and facade markets: capable of managing the pane curvatures, weights and stepped units required by the extra-jumbo format, "No Limits" IG line goes beyond the restrictions of commercial architecture. It can process extra-Jumbo units up to 12 meters of length and 3,3 meters of height, with a capacity per linear meter of up to 350 kg for single panes and 550 kg for assembled panes, with thicknesses up to 40 mm single glass and 100 mm single glass. "No Limits" IG Line can also assemble units with up to 3 chambers and is able to handle offsets up to 250 mm on the upper and lower edge and 1.000 mm on the leading and trailing side, thanks to the dynamic support of the coupled panes. Each machine that makes up the line is equipped with devices developed specifically to handle large dimensions, substantial weights and any non-planarity throughout every phase. The line can process both rigid and flexible spacers and the sealing robot can use up to 3 different sealing products in a "continuous sealing" mode, offering an astonishing quality.

| | |
|----------------------------------|---|
| MAX glass length (mm) | 12.000 |
| MAX glass height (mm) | 3.300 |
| IG unit thickness (mm) | 100 |
| IG unit weight (kg/linear meter) | 550 |
| Number of chambers | up to 3 (quadruple glazing) |
| Spacer | rigid or flexible |
| Gas filled | argon and krypton |
| Stepped unit | up to 1.000 mm (leading and trailing edge) up to 250 mm (upper and lower edge) |
| Sealing products | up to 3 |



THE HIGH SPEED IG LINE

The “High Speed Insulating Glass” project had a precise aim right from the start: slashing insulating glass production times while still maintaining the high-quality levels of the finished unit. The new High Speed line optimises every single processing stage without renouncing anything at all in terms of precision. It's designed to produce insulating glass primarily for residential use, in units measuring up to 2,000 x 2,500 mm and with single or double chamber, shaped units and Georgian bars if required. The spacer is a flexible profile and the panel sealing is hot melt. During the development of this solution, it was decided not to accelerate the processing time, so as not to compromise the final quality: rather, the entire line process was optimized, reducing downtime and making the sequences smoother, so as to gain in productivity.

The flexible spacer applicator offers a non-stop working continuity, thanks to devices like the buffer for the automatic preparation of the profile to be applied and the automatic reel changeover system. The coupling press is a special compact version, so the transit of glass through this station is as fast as possible. In the sealing robot, indeed, a new axis has been introduced with a second (rear) suction cup, which replaces the master (front) one during sealing. In this way, the master suction cup can release the glass earlier and move for the next panel. The high speed of the High Speed line is not due to accelerations on the single machinery but to the optimizing of the overall cycle: in this way, Forel can offer a fast production, while keeping the same final quality.



| | |
|------------------------|--|
| MAX glass length (mm) | 2500 |
| MAX glass height (mm) | 2000 |
| IG unit thickness (mm) | 65 |
| IG unit weight | 200 kg / linear meter |
| Chambers | 1-2 |
| Spacer | Flexible (high speed mode) – rigid (manual mode) |
| Gas filled | argon and krypton |
| Sealing products | up to 3 |

Lamination Line

ART. LL LAMINATION LINE

The Lamination Line Art. LL is Forel solution for the production of laminated glass with PVB and SentryGlas® interlayer. The line is capable of a flexible production, processing different sizes, shapes and types of glass. Like the entire Forel range, the Lamination Line Art. LL follows the company's product philosophy, offering automation, innovation and quality. Forel's Art. LL line can process multi-layer panels up to a maximum thickness up to 80 mm, size up to Jumbo (6,000 mm x 3,300 mm), whether rectangular, stepped or

shaped units. The automatic unloader can manage a finished panel weight up to 1,500 kg. The glass sheet is loaded onto the tilting table, which carries the sheet horizontally. From here, it proceeds to the horizontal washing machine. Thanks to a system of self-learning sensors, the washing machine detects the size, thickness and presence of Low-E coating on the incoming glass. The machine automatically adjusts the action of the brushes, avoiding the use of hard bristles on the Low-E coating. Then, the glass pane proceeds down the line, where a system of belts and rollers brings it into proper alignment and then positions it in the center of the line. Once aligned and brought to the center, the glass sheet is picked up by system of suction cups, which transports it to the assembly area, where the PVB roll storage (capable of holding up to 8 PVB rolls) is located. The positioning of the PVB over the glass is fully automatic, and takes advantage of the movement of the suction cup, when it gets back to pick up the second glass. Thanks to the automatic pane centering system, the positioning of the two panes is perfect. The lamination oven consists of two zones, pre-heating and reheating, which operate with progressive temperatures. Two sets of pressing rollers are in operation inside and at the end of the oven. They're conical-shaped to facilitate the expulsion of air to the outside.



| | LL04526HT | LL05026HT | LL06033HT |
|-----------------------------------|--------------|-----------|-----------|
| MAX pane length (mm) | 4600 | 5000 | 6000 |
| MAX pane width (mm) | 2600 | 2600 | 3300 |
| Max laminated unit thickness (mm) | 80 mm | | |
| PVB Storage | up to 8 Roll | | |

*Forel is constantly working on the development of new solutions.
Some data present in this report may differ from the models available on the market.



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LASERMEK FOR CUTTING AND DRILLING

LASERMEK is expanding with a new technology for float glass straight and shaped CUTTING for thickness up 8/10mm, in an optimal area of 200x200mm adjustable on the customer needs

The cutting laser is suitable to process any geometrical shape cutting for hinges, square holes and similar processes with a perfect cutting result and without chippings, suitable even to glass tempering.

The DRILLING laser allows the holes creation of any shape starting from the classic round hole to holes of any geometry and also of notches on the edge of the glass, with a maximum size of 80x80mm that can reach 100x100mm using very sophisticated optics.

The work times are close to the classic waterjet cutting systems but with a great advantage, in addition to work in the absence of water and abrasive, do not generate waste to be disposed of and above all work with a power of about 3Kw against the power required by the waterjet which is about 40 Kw



| Type | Useful dimensions |
|------|-------------------|
| | 1500 x 3000mm |
| | 2000 x 3000mm |
| | Others on request |

LASERMEK SCANNER

LASERMEK SCANNER, laser developed for engraving and ablation of any kind of coating on glass surface.

Able to remove by ablation portions of coatings, including Low-E, which vary from 0.05mm to several tens of millimeters in a single step

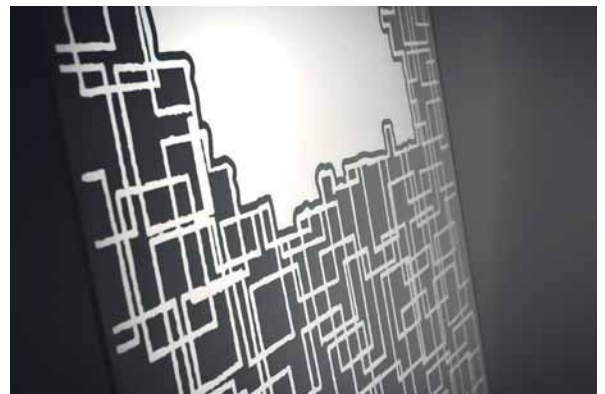
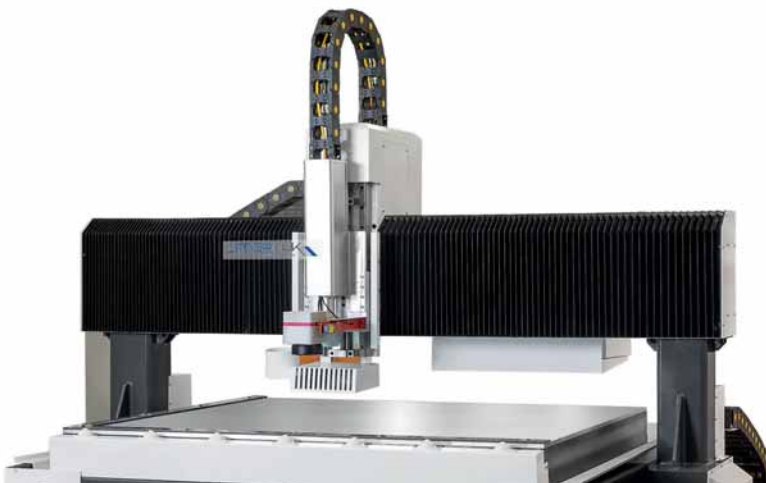
For the furniture sector, in particular bathroom furniture and in general where the mirror is required, the laser is able to remove the silvering from the mirror leaving the glass completely transparent, to enhance decorations, for the insertion of TVs, etc.

By choosing an adequate laser source, it is possible to create graphic and decorative workings on the glass surface with matt effect, particularly appreciated for the furniture and building sector, to create logos on already tempered glass, to create partitions, glass doors, windows, etc. .

Ultra fast process, it is an innovative technology for all those companies that are looking for quality and perfection.

Available in various sizes, also on specific customer request.

| Type | Useful dimensions |
|---------|-------------------|
| Scanner | 1300 x 2500mm |
| | 1500 x 3000mm |
| | 2000 x 3000mm |
| | Others on request |



LASERMEK BEAM

LASERMEK with Beam technology, is a Laser machine designed for the straight and shaped engraving and ablation of the electroconductive coating, pfor all those sector where heating glass is requested. By micro-ablation of Low-E glass for both hard and soft coating is suitable for:

- Refrigeration
Processing of electro-resistive tracks on coating for various types of anti-fog heating glass such as fridge doors and so on.

- Transport
Low-E coating ablation to increase the radio waves permeability for personal passengers devices, in trains, campers, aeroport facades, etc.
- Heating
Engraving of invisible heating coils on heating glass products for heated towel rails. Sophisticated laser process which allows to set the glass temperature with decorative effect
Available in diverse dimensions even on specific customer request.



| Type | Useful dimensions |
|------|-------------------|
| Beam | 1000 x 2100mm |
| | 1500 x 3000mm |
| | 2000 x 3000mm |
| | Others on request |

FIREMEK

Firemek is a turnkey Fire resistant glass production system for the production of fire resistant glass appreciated for its use of innovative technology combined with its ease case of use which makes the EI glass production no longer exclusive and even thanks to its affordable price which makes it suitable for medium/small business. The transition from semi-automatic system to an automated system was the natural result of Glass Company continuous desire to research and develop this product. An intumescent and extremely transparent mixture based on Silica is prepared using a vacuum mixer following a process controlled by PLC and by a special dispensing pump is poured between two or more glass sheets according to the fire resistance to be obtained E130, E160, E190, etc. The process is completed in the furnace, where cross-linking takes places by means of specially designed technology.

The Silica intumescent gel under normal conditions, is perfectly transparent and in case of fire the intumescent gel swells creating a rigid and opaque thermal insulation foam that guarantees both fire resistance and mechanical resistance (stability).

Fire resistant glass protects by flames, smoke and toxic gases, prevents the heat transmission through the glass surface and are approved to meet the European and international EI fire prevention standards requirements.





PLASMEK

Plasmek is the most recent Glass Company innovative technology.

Plasmek uses atmospheric pressure plasma for flat glass surface treatment.

It is a cleaning and treatment cell that allows an alteration of the surface tension of the glass in a single step, increasing the adhesion of the products applied in the immediate subsequent stages of processing. Among its many applications, the cleaning and preparation of glass, fundamental prior to digital printing or spray painting, as well as coating of any kind such as antibacterial, antiviral, etc. with the use of technical gases if necessary, in addition to compressed air, are the most impressive characteristics of this technology.

This processing is, also essential for certain gluing and adhesion processes with other materials, or in flat glass lamination processes to obtain highly performing finished products compared to standard ones.

HORIZONTAL GLASS WASHING AND DRYING MACHINES

Glass Company Srl, knows how excellent glass cleaning and drying are fundamental in the manufacturing process and offers horizontal Washing and Drying machines that combine high-performance technology, ease of use and competitive price, with functions designed for noise reduction and energy saving, both in terms of the drying fan power consumption and for the water use.

- Especially suitable for float, reflective, Low-E (soft coating) glass and solar glass
- Glass deep cleaning, by means of disc brushes or cerium oxide pads before digital printing, silk screen printing or enameling, lamination both with PVB and EVA
- Water-resistant construction materials (stainless steel)
- Manually operated by selectors or equipped with an intuitive touch screen system controlled by PLC.



IG LINES AND VERTICAL GLASS WASHING MACHINES

Glass Company has been collaborating since 2022 with HANJANG to supply the customers a full automatic IG Line, an intelligent unit insulating glass production, to run by one only operator and complying with Industry 4.0. The line can be combined with the Vertical washing and drying machines of high-performance technology, ease of use and competitive price, with functions designed for noise reduction and energy saving, both in terms of the drying

fan power consumption and for the water use. Our vertical washing machine is composed of loading section, washing section (pre-washing, washing and drying) and quality inspection section and is equipped with:

- Double pair of powerful air blades for fast drying
- Stainless steel pre-ashing and washing tank
- Soft brushes for Low-E glass

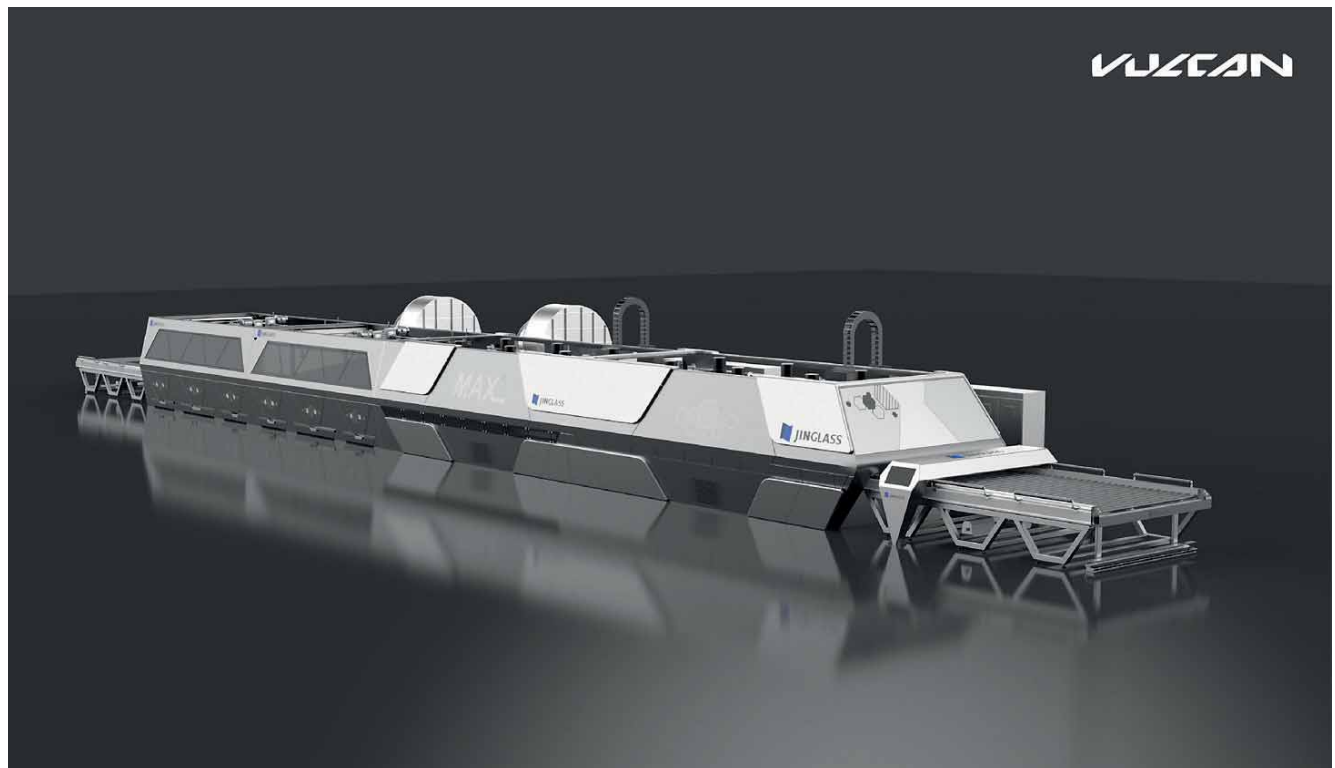


FLAT AND BENT GLASS TEMPERING FURNACES

Glass Company Srl has been continuing for over 15 years its collaboration with Jinglass for flat and bent glass Tempering furnaces and proposes tempering furnaces for all the glass types in the market, also for thin glass sheets of 2.5mm and semi-tempering for 2.2mm glass, used in the solar and furniture sectors. The furnaces are also suitable for large-sized glass sheets compared to the glass thickness. Our furnaces can be supplied in different sizes and models, for both flat and bent glass.

The tempering furnaces proposed by Glass Company carefully take into consideration the technical needs of the customers and are equipped with a patented real convection Matrix technology suitable for all Low-E glass including triple-silver coating

The new tempering furnace VULCAN combines excellent glass optical quality with very low energy consumption thanks to a very high technology.





GIARDINA GROUP

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SPRAYING MACHINE DUALTECH 400 SBC GLASS

The machine has been designed to spray on glass surfaces. The conveyor system consists of a PVC belt which is protected by a paper film unwound from the infeed reel and wound at the outfeed by a drive unit, which ensures its constant speed. The "Dualtech" spraying technology is guaranteed by two opposite reciprocating arms joined together. The system can accommodate up to 4 spray guns and includes the lacquer feeding and lacquer return, in order to make easy and quick the flushing and to minimize the quantity of the cleaning solvent. The spraying parameters are independent for each gun. A reading bar at the infeed of the machine manages the spray control. The air distribution plenum box ensures efficient air flow, thus reducing the paint overspray.



ROLLER COATING LINE FOR GLASS ROLLTECH G05-GL

The line is designed for roller painting and drying of small or large glass sheets (working widths from 1300 to 3300). The line consists of a Heavy-duty roller coater G05-GL, a Drying Tunnel GP/JET IR with Cooling GP/Cool. The connection roller conveyors are equipped with transversal bars with revolving wheels installed on a pneumatically liftable frame for workpiece alignment. The roller coater G05-GL it's a machine for the application of water-based coating products both organic and ceramic on glass.

The Drying Tunnel Mod. GP/JET IR with Cooling GP/Cool has a conveyor made by high temperature resistant rollers. After the passage in the preheating section the IR lamps optimize the curing of the coating product: the air is blown on the coated glass as high-speed air blades. The ambient air cooling section, by means of high-speed air blades, ensures a quick and homogenous temperature drop of the glass.





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HORIZONTAL AND VERTICAL WASHERS

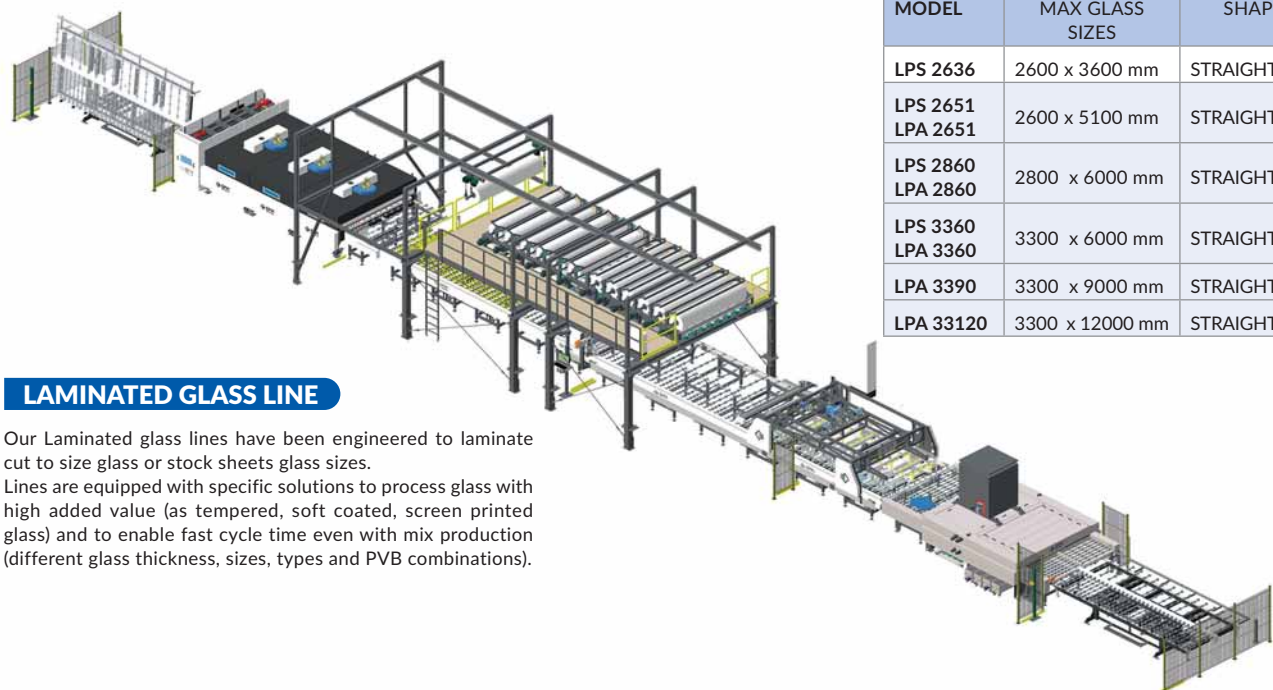
Washers are specifically designed to wash and dry flat glass after grinding or edging process (double edger, vertical arising, CNC lines) or before processing lines as insulating glass line, laminating, tempering or printing lines.

- Washing frame totally stainless steel made
- High pressure pumps 150-180 bar to remove glass dusts and residuals after edge or surface processing
- Each brush is driven by specific motor
- Motorized opening system for glass thickness adjustment
- Soft Coated brushes for washing sensitive coated glass
- Automatic glass thickness checking and opening adjustment
- Conductivity system to check water quality on tanks
- Electronic components (PLC, I-O boards, HMI and inverters) easy to find in the market



| HORIZONTAL WASHERS | | | |
|--------------------|-----------------|-----------------|---------|
| MODEL | MAX GLASS WIDTH | GLASS THICKNESS | BRUSHES |
| HW 2000 | 2000 mm | 3-25 mm | 4-6-8 |
| HW 2600 | 2600 mm | 3-25 mm | 4-6-8 |
| HW 2800 | 2800 mm | 3-25 mm | 4-6-8 |
| HW 3300 | 3300 mm | 3-25 mm | 4-6-8 |

| VERTICAL WASHERS | | | |
|------------------|------------------|-----------------|---------|
| MODEL | MAX GLASS HEIGHT | GLASS THICKNESS | BRUSHES |
| VW 2000 | 2000 mm | 3-40 mm | 4-6-8 |
| VW 2500 | 2500 mm | 3-40 mm | 4-6-8 |
| VW 2800 | 2800 mm | 3-40 mm | 4-6-8 |
| VW 3300 | 3300 mm | 3-40 mm | 4-6-8 |



| LAMINATED GLASS LINE | | |
|----------------------|-----------------|----------------|
| MODEL | MAX GLASS SIZES | SHAPE |
| LPS 2636 | 2600 x 3600 mm | STRAIGHT, U, Z |
| LPS 2651 LPA 2651 | 2600 x 5100 mm | STRAIGHT, U, Z |
| LPS 2860 LPA 2860 | 2800 x 6000 mm | STRAIGHT, U, Z |
| LPS 3360 LPA 3360 | 3300 x 6000 mm | STRAIGHT, U, Z |
| LPA 3390 | 3300 x 9000 mm | STRAIGHT, U, Z |
| LPA 33120 | 3300 x 12000 mm | STRAIGHT, U, Z |

LAMINATED GLASS LINE

Our Laminated glass lines have been engineered to laminate cut to size glass or stock sheets glass sizes. Lines are equipped with specific solutions to process glass with high added value (as tempered, soft coated, screen printed glass) and to enable fast cycle time even with mix production (different glass thickness, sizes, types and PVB combinations).

www.gpmautomation.com

- LPS model includes fully automatic glass squaring and assembly; PVB laying and trimming process is done manually by operator.
- LPA model includes fully automatic glass squaring, assembly, PVB laying, PVB cross cutting and PVB trimming on leading glass edge; as option we can offer automatic loading/unloading with gantry system or with robots, and fully automatic PVB trimming on all glass sides.

- Accurate glass squaring system by means of pop-up tables with belts system to push glass on reference locators and laser beam sensors for precise glass stop on the reference positions. Multiple glass squaring option for squaring and assembly 2/3/4 glass panes simultaneously.



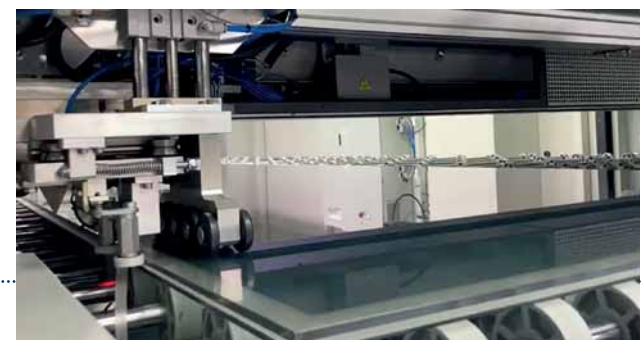
- Suction cups transfer lifts and lowers with motorized belts system, it ensures fast speed and accurate glass assembly, since speed and releasing positions are controlled by encoder to avoid glass floating during the assembly process.

- Automatic PVB laying on the glass through specific motorized bridge or with clamps system integrated on the suction cups transfer (for straight line configuration).



- Innovative system for PVB cross cutting, that is done after the assembly and over the leading glass edge to enable simultaneous PVB trimming on the leading glass side (low PVB waste and faster trimming cycle time).

- Automatic PVB trimming on all glass edges, by means of specific cutting heads that adjust according to glass sizes.



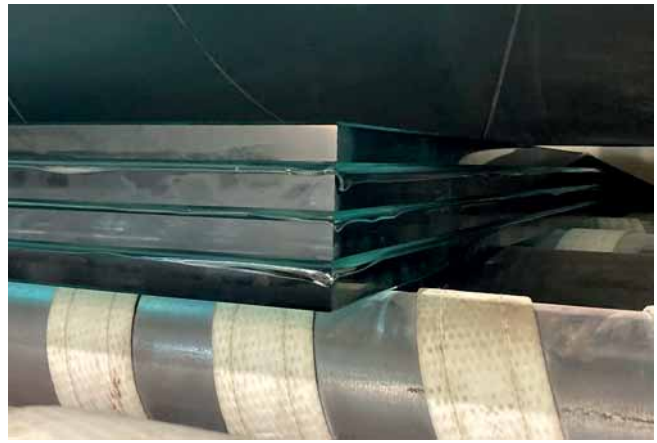
- PVB UNWINDER 6÷18 ROLLS; overhead platform for easy PVB rolls change, loading and maintenance (standard in the LPA line, option for LPS line).



- Heating furnaces work with combination of infrared lamps (with SCR power regulation) and forced air convection system by means of top and bottom fans, that blow and recirculate the air through specific designed channels. Forced air convection system ensures to uniformly heat soft coated, reflective or painted glass, heavy thickness glass panes. Infrared lamps heating ensures fast adjusting speed during the lamination of clear and extra clear glass with thin thickness. Each module is equipped with accurate temperature control sensors and exhaust fan on top part in case of overheating.

- Nip roll has been designed to laminate tempered glass and shape glass with sharp corners, very easily in fully automatic mode according to set recipes by means of accurate control system.
- Press top roll adjusts automatically through Bosch Rexroth ball screws, servomotor and gear system.

- Servomotors work in electric axis and check continuously the flatness positioning of the top roll in order to ensure correct and uniform pressing distribution and to avoid different pressing power force on the working width size. Pressing power with very accurate control and synchronization for processing shape glass without breaking the tight corner.



www.gpmautomation.com

- Hydraulic tilting table for loading/unloading glass up to 12 m (no. 2 tables working together).



- As option gantry loader for automatic loading/unloading glass up to 9 m.

ROBOTIC TRIMMING FOR LAMINATED GLASS FINISHING

Robotic line enables to trim PVB, Sentryglas and EVA film that overhangs glass edge after laminating process.

- Max processing glass size: 2700x4000 mm (bigger sizes can be designed if require).
- Complete line including inlet and outlet conveyors (as alternative rotating conveyors system can be supplied for a square layout configuration).
- Vertical trimming conveyor with back supporting suction cups to let robot trim bottom glass edge.



- Blade and engraving tool for removing the inner interlayer on grinded edges.



TURNKEY SOLUTIONS FOR AUTOMATIC LOADING/UNLOADING

| Features | Sizes |
|------------------|----------------|
| Max glass sizes | 3.300x6.000 mm |
| Max glass weight | 700 Kg |

| Glass process | Application |
|---------------------------------|-------------------|
| Cutting line | Loading/Unloading |
| Insulating glass line | Loading/Unloading |
| Double edgers | Loading/Unloading |
| Vertical arrising/grinding line | Loading/Unloading |
| Tempering oven | Loading/Unloading |
| Printing/painting line | Loading/Unloading |
| CNC vertical/horizontal | Loading/Unloading |

a) IG AND GRINDING LINE AUTOMATIC LOADING/UNLOADING

- Turnkey solutions for automatic loading: including vertical motorized conveyors, that are synchronized to vertical arriser, grinder, or integrating our vertical washer.



- Turnkey solutions for automatic unloading; including vertical motorized conveyors, that are synchronized to sealing robot.

- Suction cups gripper with bottom brackets for supporting heavy IG units up to 500 kg and size 2,7x5 m.



- Automatic shutter door and safety gate enable to replace racks without stop robot loading/unloading process.

b) DOUBLE EDGER AND PAINTING LINE AUTOMATIC LOADING/UNLOADING

- Double edger configuration: «U» shape with one robot or «L» shape with 2 robots.



- Loading conveyor with automatic adjustable reference line.

- Including horizontal washer and unloading conveyor with glass aligning system.
- Rotating platform for storing 2 racks and enabling to replace racks without stopping robot loading/unloading process.
- Paper strips applicator for separating glass sheets.

SORTING SYSTEM FOR IG UNITS WITH ROBOTIC LOAD

- Sorting system by means of high speed shuttle (100 mt/min).
- WMS – warehouse management software.
- No. 110 storing slots (more slots can be added according to available space).
- 90° turning station enables to transfer the IG unit on PVC window assembly line.



- Robotic loading into the storage.
- Barcode/QR code reader enables to track IG units ID with our WMS.
- Underfloor rotating platform enables to turn A shape rack automatically.

HARP RACK AND AUTOMATIC LOADING/UNLOADING SHUTTLE

- harp rack with 46 slots for max glass up to 2.000x2.500 mm;
- heavy capacity up to 2 tons;
- specific protections avoid that glass slides out of the harp rack during transport;
- handle and big wheels makes easy harp manual pulling;
- arrangement for forklift picking;
- automatic shuttle could be combined to harp racks for automatic loading of the glass into IG line or other vertical processing line; glass can be also placed automatically into the harp by specific shuttle solution.



STOCKING SYSTEM FOR CERAMIC TILES AND GLASS

| Features | Sizes |
|--------------------------------|----------------|
| Max glass/ceramic tiles sizes | 3.000x3.300 mm |
| Max glass/ceramic tiles weight | 600 Kg |



- Glass and ceramic tiles are automatically unloaded from delivery racks to storage slots through the robot and shuttle system.
- No. 70 storage slots (more can be added according to available space); each slot with capacity 3 t.
- Integration with cutting/processing line: robot unloads the glass/ceramic tiles from the storage and load into the cutting/processing line.

helios quartz®



HELIOS ITALQUARTZ Srl

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INTEGRATED EFFICIENT SOLUTIONS

INFRARED MODULES



Complete infrared solutions, designed and customized according to customer needs, and ready to be integrated in existing machines and production lines;

QUARTZ INFRARED HEATERS

In short, medium and fast medium wavelength, in single and twin tube, with or without gold reflector for:

- Laminating lines (plastic film coupling);
- Screen printing lines;
- Bending furnaces;
- Fusion furnaces;
- Laminated glass cutting tables;

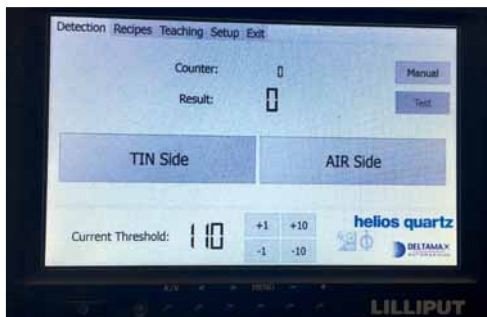


UV POLYMERIZATION EQUIPMENT



UV high and medium pressure lamps for drying screen printing of reactive inks, paints, coatings and adhesives for the decorating and furnishing sector;

AUTOMATIC TIN SIDE DETECTOR



Compact automatic version of this device. It can be fixed directly on the glass transportation line, before the production process, in order to check each and every piece of glass. A user-friendly PLC helps the operator in calibrating and managing the different recipes.





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GLASS PLANTS

HORN Glass Industries AG is the industry leader in turn-key plants.

HORN's objective is to realise your project both economically and ecologically in accordance with your requirements. Your schedule as well as local requirements and conditions are important influencing factors. HORN® supports you from the first rough draught, over realisation up to and including the permanent support of production, even after your glass plant is finished.

HORN is a specialist for realization of the following turn-key glass plants:

- Float Glass Plants
- Container Glass Plants
- Cast Glass Plants
- Sodium Silicate Glass Plants



PROJECT MANAGEMENT

HORN is in the glass market since 1884 and has gained a reputation for working accurately, expeditiously, and in a proper manner. The HORN® project management team takes care of all matters and leads the customer from the first conversation till the first glass flow. Even after commissioning, the experts ensure a trouble-free furnace operation through technical advice and training of your operations staff.

HORN treats every customer based on individual needs.

HORN offers project management service as:

- Feasibility Study
- Basic Engineering
- Detailed Engineering
- Site Management
- Training
- Operational Support





IMMMES Srl

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DTP100

Filtration system for dirty water from glass process.
 Size: 100.000 litres/hour.



Subdivided phases follow here:

PROCESSING WATER COLLECTION

Dirty factory water flows through channels to the Collection Tank with possible big parts and extraneous material stopped from entering by an initial filter in a small pit before the collection tank. A fluidization ring with several water jets fed by the primary pump operates at the bottom of the collection tank (see **PUMP STATION**), preventing sludge from collecting within the tank at its corners and bottom.

PUMP STATION

Two identical pumps operate with alternate daily cycles, conducting the water from the tank to the treatment system - each installed with a non-return valve, filter and anti-cavitation system fitted on its intake pipe. To supply the fluidization ring, a small part of the pumped flow returns into the collection tank. The entire DTP system is filled with water, operating completely by pressure from the initial pump, which is maintained right through to the processing machines. Several visual, electronic pressure meters control pump work, so providing information to the main CPU.

DECONCENTRATOR

The physical-dynamic water and glass mud separation occurs within the main tank. Dirty water is pumped into a small hole at the bottom part of the tank before flowing out almost completely cleaned from the tank top. The Deconcentrator has a particular fixed circuit that forces different water flow speeds, so achieving the separation of the suspended solids and glass particles from the main body of water. The glass mud remains automatically in two chambers within the lower part of the Deconcentrator and the clean water at the end of this circuit flows out from the tank top. The glass mud is regularly disposed of from the Deconcentrator by the programmed operation of 2 pneumatic valves (see **SLUDGE DISPOSAL**) whose sequence is controlled at scheduled times by data from the flow controls.

MICRO FILTRATION

Upon exiting, the Deconcentrator water -still pushed by the initial pump pressure- is filtered through a traditional multi-mineral filter whose filtration quality results from this MICRO FILTRATION. Residual solid particle dimensions that are less than 10 microns and total ppm are now at less than 10 mg/lit, leaving the water quality clear (LIMPID). After filtration, the clean water flows directly to the processing machines through an existing distribution ring (always with the pressure generated by the initial pump). Taking about 35/40 minutes,

this mineral filter is self-cleaning on a daily cycle and is typically programmed for night operation at some convenient time (set to automatic start, which can also take place at weekends or during holidays. In automatic-mode, the mineral filter combination of circuits allows for the following: WORK - SELF-WASHING - RINSE - FILTER BYPASS - the last being only in safety mode). The rinse (back-flushing) water is dumped to waste. The filter has 2 iron plates inside with dozens of holes on each one - all fitted with an ejector that holds the minerals within the unit and lets the water pass through during the WORK, SELF-WASH and RINSE cycles. Dirty water discharged during the self-washing cycle returns into the initial collection tank.

DECONCENTRATOR SLUDGE DISPOSAL

With water heavily charged with glass mud, the Deconcentrator's two sludge discharge lines lead to a "Big-Bag" filtration station. Two disposable big bags filter the water, keeping the bag the solids (sludge) inside and filtering the residual water into a base tank/basin and, from there, back to the initial collection tank. The removal of the big bag, when filled with solid sludge, is made with a simple forklift and replaced with a new one. For a faster dried sludge extraction, the Filterpress (DGS) is available as an OPTION to replace the Big-Bag station. The DGS is given as standard for the systems from 70 m3/hour and bigger.

ELECTRIC PANEL AND CONTROLS

All functions are selectable in Manual or Automatic mode, with normal use being in Automatic. Switches from the control cabinet for each single function enable all these options and a PLC touchscreen enables the management of all parameters and system controls, divided into several user menus. To ensure appropriate power supplied for required water flow, an inverter manages the pump/s RPM and power consumption. The main control board registers all warnings or alarms and a combination of warning lights and/or sounds will raise any situation alerts (customizable). The system includes a connection board to enable aftersales assistance Remote Control or for Remote Staff Control of the system, as desired. The DTP system is equipped with a station for real-time pH measurement and, if necessitated, an automatic adjustment or maintenance system of the value within limits preset by the customer can be performed.

OPTIONAL EXPANSION AND MODULES

The DTP system is perfectly expandable by simply adding other purification modules (Deconcentrator + Filter) to the existing system. Here it's advisable to install the **Predisposition**, where pumps and control systems already support future expansion. If necessary, the DTP can take water to be treated either from the underground tank or from one above-ground (point 1). On request, the system can be controlled remotely, whether directly by management or via mobile devices/PC by operators based at home or in the office (user authentication required). Should the factory be operational 24/24 then there are various ways to keep the system active around the clock - even during the Backwash phase (points 20 and 21). Fully-automatic management, based upon constant analysis and work parameter processing, renders a DTP interface with any machine or central control system possible. On the basis of settable values, expansion is available for data-export or bidirectional consent management (e.g. sending a message to some machine operator -or- to the machine itself- in the event of pressure dropping below the 2.0 bar).

GENERAL INFORMATION

In a single water outlet, the DTP supplies its nominal water capacity - all treated and cleaned with the abovementioned quality parameters (see **MICRO FILTRATION**) and suited to 23.5 hours of work on a 24 cycle. If required, a 24/24 (continual operation) module can be an option. To satisfy all requirements from the small laboratory to the giants of glass processing, the system is available in different sizes from 12 to 250 m3/hour (see table). Finally, we invite readers to refer to the **DTP Advantages** sheet to match the above info to a collection of unique benefits and performances. A **Business Plan** template, available upon request, will afford a comparison of current investments and operating costs - either with your existing system or with potential competing choices.

www.immmes.com

IMMMES
The Spirit of Innovation

DTP

DTP size from 12 m³/h to 50 m³/h with a single Deconcentrator/Filter. The application of a Filterpress DGS350 is possible in replacement of the Big-Bag Station.



DTPs

The smallest of the DTP family, is particularly configured to permit an easy access for all factories with few machines.



REVERSE OSMOSIS s

Reverse Osmosis s for water demineralization. Sizes: from 100 to 500 litres/hour.



REVERSE OSMOSIS

Reverse Osmosis plant for water demineralization. Sizes: from 1.000 to 10.000 litres/hour for washing machines and cooling systems.



FILTERPRESS DGS

Filterpress unit for extraction and compaction of grinding sludges. Size: 350-630. Can be used either as standalone filtration unit or as DTP-type systems component.



ANTEAONE

Unit for purifying water contaminated by paint and varnish, residue from washing the painting machines.





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PLATFORM TRANSPORTERS

Self-propelled transporters with loading capacity ranging from 5 to 60t and beyond, used for handling flat glass on stillages.

They find application in the handling of glass racks from the stackers to processing lines and warehouse handling.



INLOADER TRANSPORTERS

Vehicles for transporting glass on jumbo size stillages from the stackers of the float line to the warehouse, as well as for performing normal handling within premises.

They are usually equipped with a 33t loading capacity; upon request, versions with a loading capacity of 45t and over can be made available.



SIDE-LOADERS

Machines for transporting glass packs within the factory. They have independent PLC-controlled wheels for moving in all directions.

Versions with loading capacity ranging from 3 to 20t and more are available, which can transport all glass sizes, from DLF or LES to jumbo and XXL jumbo sheets.



SPECIAL-APPLICATION SIDE-LOADERS

By continuing to design innovative vehicles that are applied in different sectors of the glass industry including laminated and solar glass, Italcarrelli develops tailored side loaders with hydraulic equipment, attachments and clamping devices, for handling packed glass or on special racks.





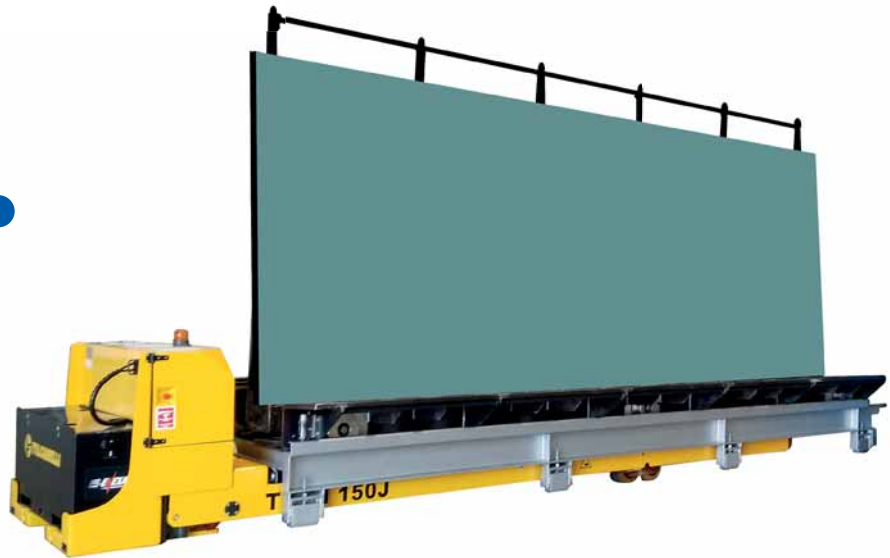
CONTAINER LOAD / UNLOAD

The patent by Italcarelli for the loading and unloading of box glass from closed top containers thanks to its hydraulically extensible arm which can rotate by 90° to the right or to the left.

This machine finds application in the handling of glass from containers and 40ft containers, on warehouse racks, from containers on loading deck or on truck.

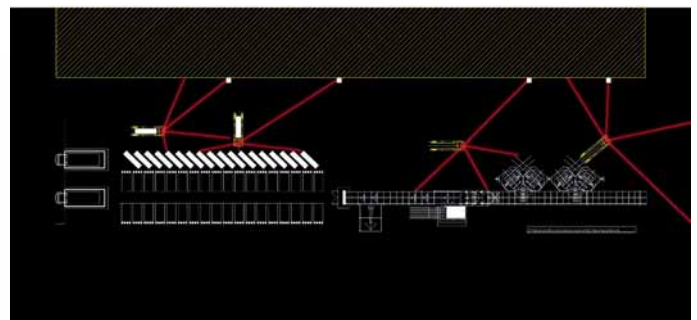
LAMINATED GLASS HANDLING

Available with load capacity beyond 60t, these lift trucks can be used in the handling of laminated glass within the autoclave, depositing the rack with glass inside the autoclave and moving it again once the process is finished.



AGVS/LGVS

Italcarelli can transform its machines into Automated Guided Vehicles, featuring inductive and optical guidance systems, yet above all Laser Guided Vehicles.



The laser guidance is an innovative and smart system that can be installed on any vehicle to turn it into a self-driving machine.

This system provides very high accuracy, even more than 5 mm in terms of positioning. It is very flexible since the routes can be easily generated, modified or extended, without particular impact on the facilities.

italmatic[®]
AUTOCLAVES OVENS & PRESSES

ITALMATIC Srl

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AUTOCLAVES AIV SERIES 3.000 - 3.300 - 3.800



The new line of autoclaves, "Industry 4.0 ready", designed to process curved and flat glass with the best loading flexibility both horizontally and vertically, with silicone bags or disposable bags.

The autoclave can be placed on the floor without needing to be pits and can produce laminated glass up to 3210mm sheets.

The vacuum is controlled automatically by means of an advanced control system that satisfies the most restrictive process requirements.

The plant can be supplied with automatic or manual loading systems complete with all operating safety devices.

AUTOCLAVES AIV SERIES 4.000 - 4.200 - 4.400

Where production needs become important Italmatic presents the new line of autoclaves for large glass production "Industry 4.0 ready", with load capacity up to 40 tons.

The autoclave is pits into the floor and served by an automatic loading system that allows effective handling of the glass to be processed and processed, in the shortest time and in complete safety.

Laminated glass up to 3210mm sheets can be treated in both curved and flat versions. The lamination cycle is controlled automatically by an advanced control system **ICS (Italmatic Control System)** which allows the complete traceability of the process with identification of the production batches.

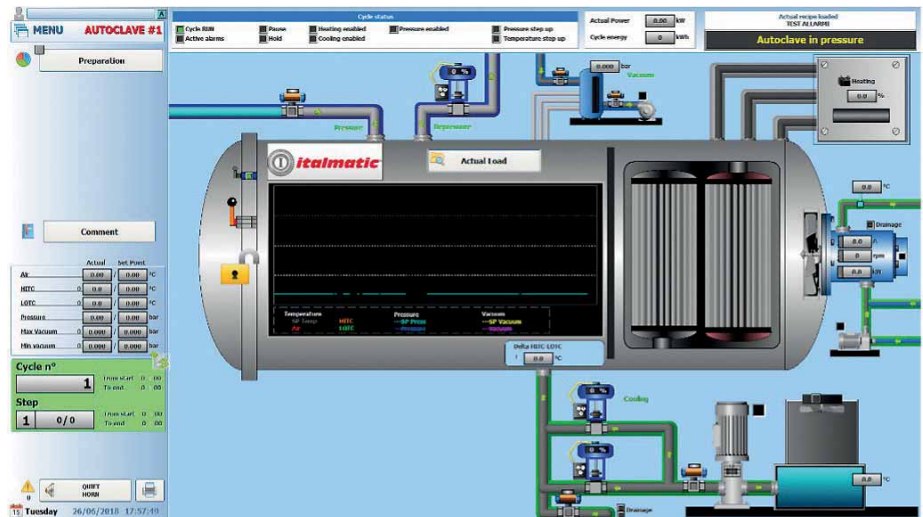
The plant can be supplied with integrated MES systems for interfacing with factory management systems.





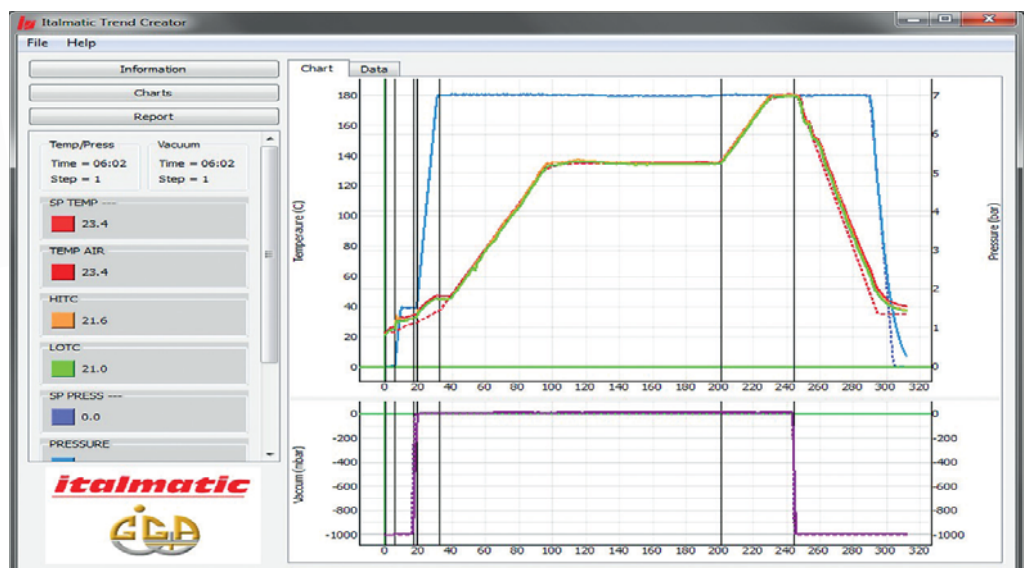
ICS (ITALMATIC CONTROL SYSTEM)

ITALMATIC has its own “software house” which develops all the control systems for all its machines. This means that ITALMATIC always ensures direct assistance and possible customized development to all its customers, not having to resort to third-party companies that can create delays or even waivers to assist customers. The ITALMATIC advanced control system **ICS (Italmatic Control System)** consists of a software application package dedicated to the application of glass lamination with PVB and EVA, which fully satisfies the most restrictive regulations on the market in terms of quality and traceability. All our software is “Industry 4.0 ready” and interfaceable with company management systems with dedicated MES, and all our machines are assisted with remote assistance from our dedicated technical service, which supports all our customers anywhere in the world.



ITW (ITALMATIC TREND VIEWER)

ITALMATIC offers its customers free of charge a special software called “Viewer” that can be installed on any PC, which allows you to view all the cycles carried out in the autoclave in order to carry out qualitative tests and / or in-depth reporting for each batches produced.





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ASTRA

A new technology wheel: high performance, super polishes with excellent adaptability, excellent durability with much lower price. Available with internal cooling and in peripheral form, excellent on vertical CNC machines such us Vertmax, CMS, Skillglass and horizontal machine such us Master, CMS and Bottero-Bimatech.



ARRIS WHEELS LINE

Types BLACK/AR2 are advised to polish the arris after diamond wheel, types RED/AR1 are advised to make the arris without diamond wheel. All types it can be supplied with any type of plate for all type of machines.

AB4 type, becomes very famous in recent times, is advised to polish arris on double edger and straight machine. It guarantees a perfect and brilliant result.



CUP WHEELS LINES



Wheels product for all type of machines in grit 40-60-80-120, available with rigid plastic plate, aluminium plate and special plate J40 for Bavelloni. On request with slots for laminated glass.





keraglass

KERAGLASS Srl

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VISION 800

OSCILLATING TEMPERING FURNACE TO TEMPER THE LATEST GENERATION GLASS SHEETS

Regarded as a revolutionary machine in the flat glass tempering sector due to its high quality and efficiency standards (particularly its ability to produce low-E and large panes with an emissivity of 0.01), combined with an aesthetic profile that ensures functionality, high performance and visual appeal all in one. This marvel of innovative technology is the result of long-term research backed up by ongoing dialogue and discussion with client companies. The heart of the machine is the Supervision Intelligent system with live-sight control, which allows the operator to clearly see and precisely monitor each stage of the process. The result is a glass end-product without any hidden defects that is made to measure and tailored to clients' requirements, with all the requisites needed to decorate the walls of modern buildings while ensuring energy saving and environmental sustainability. Numerous installations around the world confirm the immense success of this machine, which is recognised as a best-seller in the production of the latest generation tempered glass.



CHARACTERISTICS

- Big size low-E glass sheets E=0.01
- Tronik System: modular convection system based on blowing air preheated to 700°C
- Minimises optical distortion of the glass
- Dynamic heating cycle (DHC)
- Thermal insulation up to 1250°C
- Scanner control for constant monitoring of glass surface temperature, with storage of loads and product certification
- Supervision Intelligent: live-sight control system with large touchscreen monitor providing perfect visibility, plus a simple and intuitive user interface for fast and accurate diagnostics
- Kerasoft: software interface to control power consumption and scheduled maintenance
- Compatibility with RCK, an extremely precise roller cleaning machine with a rapid system of interchangeable pads

VIVIDA

HIGH-DEFINITION DIGITAL PRINTER WITH CERAMIC INK

Vivida combines flexibility, practicality, and quality.

Vivida is a high-definition digital printer that uses ceramic ink. It is ideal for reproducing any kind of image on the glass surface and can be used in all sectors, especially in furnishing, architecture and automotive.

The innovative software can process the graphical designs to be printed on the glass in a simply and intuitive manner. The propriety software and industrial computer installed on the machine manage all of its operating parameters through a simple and direct user interface.

CHARACTERISTICS

- a glass cleaning system can be installed upstream of the print room to remove contaminants and dust from the glass surface before printing
- the glass is transported through the printing process on calibrated belts driven by a brushless motor controlled with absolute precision
- an electromechanical system allows automatic glass centring of various types without requiring operator actions
- the head is moved by a linear motor

- rapid colour change and tank cleaning, automatic colour mixing system with motor and magnets
- use of xaar heads
- option of working with various ink makers
- an exclusive system mounted below the printing heads magazine allows operation of the heads to be paused without necessitating unscheduled maintenance actions





LiSEC AUSTRIA GMBH

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TPA

INSULATING GLASS LINE FOR THERMOPLASTIC SPACERS

This line is the result of consistent further development based on quality and flexibility. This line sets new standards in the processing of thermoplastic spacers. It combines gas-tightness of the units with simultaneous adherence to minimum manufacturing tolerances and therefore satisfies the constantly increasing requirements placed on insulating glass manufacturers. A wide range of unit thicknesses can be processed and set-up times are short. This leads to optimised production, because a number of production steps - for example frame production, logistics and frame storage, etc. - are superfluous.

HOW IS THE INSULATING GLASS LINE STRUCTURED?

This insulating glass line consists of a six-brush washing machine, a quality scanner, a frame setting and inspection station, a TPA applicator for thermoplastic spacers, an assembling and gas filling press, and a sealing machine.

HOW DOES THE INSULATING GLASS LINE FOR THERMOPLASTIC SPACERS WORK?

The glass sheets are thoroughly cleaned and then dried in the washing machine. The glass lites sheets are inspected at the downstream frame mounting station, and it is possible to set rigid spacers manually. The spacer bar strand is then automatically applied to the TPA and the sealing point is pressed. The spacer width can be steplessly changed without interruption. The gas filling press takes care of the assembly, the gas filling process and the pressing of the insulating glass units. At the end of the line, sealing ensures the necessary stability and, above all, perfect corners.

FOR WHOM IS THE INSULATING GLASS LINE SUITABLE?

The insulating glass line for thermoplastic spacers

is ideal for companies that require a rapid cycle time and a high degree of automation. This system is also the first choice when producing custom shapes.

WHAT ADVANTAGES DOES THE SYSTEM OFFER?

The washing machine with up to eight brushes and two hot water zones ensures perfect washing results. Damage and scratches in the glass can be detected in the shortest possible time thanks to the optimum lighting at the inspection station. This insulating glass line impresses with a very high degree of automation. The bending, cutting and filling of rigid spacers is eliminated



| TECHNICAL DATA | | | |
|------------------------|--|------------------|------------------|
| | LiSEC TPA 25/20 | LiSEC TPA 40/30 | LiSEC TPA 60/33 |
| Glass thickness | 2.3 - 19 mm | | |
| Minimum size | 350 x 180 mm | | |
| Maximum size | 2,500 x 2,000 mm | 4,000 x 3,000 mm | 6,000 x 3,300 mm |
| Glass transport height | 520 mm (+/- 20 mm) | | |
| Maximum load | 250 kg/lm | | |
| Max unit thickness | 12 - 80 mm (100 mm optional) | | |
| IG types | 2 - 3-fold | | |
| Step units | 3-sided stepped units: UK = 0 mm, VK + HK + OK = 0 - 200 mm | | |
| Data line | Line Management | | |
| Geometries | Rectangle, optional shapes according to LiSEC shape catalogue | | |

by the direct application of a thermoplastic strand that serves as a spacer. The thermoplastic spacer system provides a warm edge in the insulating glass due to its high thermal insulation. The assembly and gas filling press not only reduces gas losses but also the cycle time.

THE HIGHLIGHTS

- Continuous all-around application with perfect corner shape
- Variable change of spacer width possible without conversions
- Small space requirement compared to conventional spacer systems

LAMINATION

LiSEC Lamination Line is the intelligent and customer specific lamination line for PVB and SGP-foils. We distinguish in PlusLam and MaxLam.

PlusLam is a single storey production line with 3, 6, 9 or 12 foil-rolls magazines. MaxLam is a double storey production line with 12, 18 or 24 foil-rolls magazines. Both lines are available in three standardized configurations.

COMPACT - it's the most cost effective way for prelamination for a low volume of laminated glass.

COMFORT - it's a comfort and ergonomic high-speed and semi-automated lamination line for customers with a big mixture of products and many special shapes. The line is designed for a mid to high volume.

PREMIUM - it's a comfort, ergonomic, personal-saving high-speed and nearly fully automated lamination line appropriate for customers with a large production volume of lamination glass. Most of them rectangular. This concept sets the focus strongly on elements important for each organization, such as production cost reduction.

All lines are available with the Pre-Nip Machine PNM-A up to 100 mm or with the PNM-B up to 60 mm and on demand up to 80 mm. PNM-B is as a single-nip and also as a double-nip press available. So whatever you choose, you always get the spindle-pressing-technology for accurate and parallel pressing as well as both heating-systems, convection and radiation to laminate thin coated glass in the same quality like thick glass.

Due to the special designed IR-Heaters, the quick upheating for switching off and on as we need, also the Ecoheaters to segment the width into two heating segments, the automatic speed-adjustment instead of opening the flaps to cool-down the oven helps to save energy. Speed Assembling, automatic foil-length-measurement, automatic foil-cross-cut, automatic foil-laying and automatic foil-trimming on all four shapes of rectangular glass-sheets helps us to increase the degree of automation and also of the higher productivity.

HIGHLIGHTS

High Output through smart technology

Fast Pre-Nip lamination speed on very short furnace length due to combination of special radiation & convection system

Energy efficient due to intelligent heating system

Advanced radiators heating up from approx. 25 °C to over 900 °C in less than

60 seconds. The heaters are only in use when glass is being processed in the pre-lamination machine. In addition, the automatic glass width detection at the infeed controls the switch between half and full radiator width.

Precise adjustment of press force and gap due to servomotor-controlled press

Double-sided electrical control of the presses with servo spindles ensures perfectly parallel pressing with exact press force and enables easy, toolless fine adjustment of the presses.

High positioning accuracy

The positioning accuracy of the glass is +/-0.5 mm (half of the max. length)

The positioning accuracy of the glass is +/-1.0 mm (max. length)

Positive feasibility studies with 1 mm thin tempered glass

The gentle accurate press technology allows to laminate very thin glass.

Turn-key package solution

When additional equipment, such as autoclave and clean room, is purchased from LiSEC, we take care of the complete coordination to provide a turnkey production for composite and laminated safety glass.

Highlights PlusLam

- Cost-effective entry-level lamination line
- Dimensions 2,000 x 4,000mm up to 3,300 x 12,000mm
- Simple operation with Smart Press Technology
- Single Nip or Double Nip Press possible
- Economic single storage climatic room CCR-A1
- Foil unwinder for 3, 6, 9 or 12 rolls in one floor

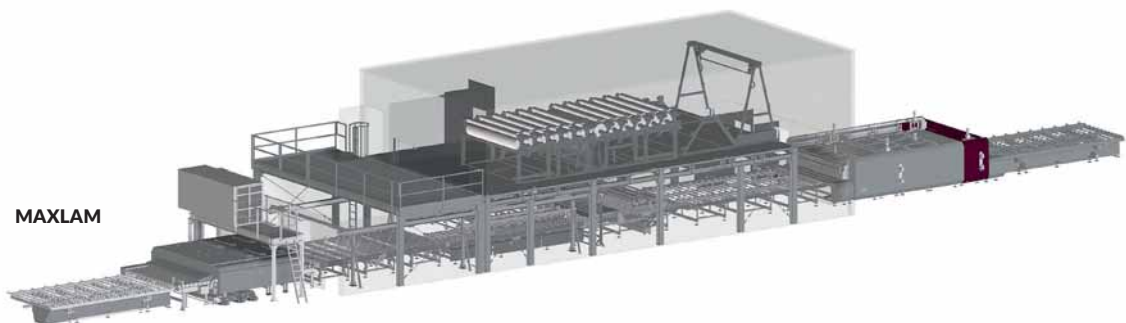
Highlights MaxLam

- very flexible by using the maximum numbers of foils
- Dimensions 2,000 x 4,000mm up to 3,300 x 12,000mm
- Simple operation with Smart Press Technology
- Double storage climatic room CCR-A2
- Foil unwinder for 12,18 or 24 rolls on second floor
- Straight-Form

PLUSLAM



MAXLAM



LAMINATED GLASS CUTTING SYSTEM SOLUTION WITH VSL-A

State-of-the-art laminated glass cutting system with two cutting bridges and dynamic load control for continuous and high cutting performance with simultaneous maximum edge quality and efficiency with respect to wastage and operating cost reduction.

HOW IS THE LINE FOR LAMINATED GLASS CUTTING CONSTRUCTED?

The laminated glass cutting system solution from LiSEC is composed of an infeed-side system for automatic removal of the film overhang (FASV), as well as a Lucite scraper brush, a system for removing the surface coating (GFB, ESL, DSC-A), and up to two laminated glass cutting bridges (VSL-A) positioned one behind the other. The automatic removal of the film overhang enhances



cutting accuracy, improves process reliability throughout production, reduces the need for operator intervention and allows the raw glass to be processed without any trim cutting, which reduces glass consumption and consequently operating costs.

The system solution can be equipped with or without an edge deletion unit, for the removal of thermal insulation coatings as well as solar protection coatings. An efficient, fast and residue-free technology by means of a grinding wheel is used. A transport section following the edge deletion system acts as a buffer and thereby decouples the edge deletion process from the first laminated glass cutting bridge.

The first VSL-A cutting bridge from LiSEC cuts the front trim cut up to a minimum of 20 mm, cuts the X-sub plates of the cutting optimisation, automatically rotates the X-sub plates by 90° and removes the Y-residue on the trailing edge. Belt transport fields feed these prepared and rotated sub-plates to the second laminated glass cutting bridge, which cuts, breaks and separates the Y-, Z-cuts from the PVB-foil quickly and fully automatically with minimal wastage. The finished cut sheets are then either removed manually by a system operator or fed to a downstream automatic sorting system, fan carriage loading unit or robot removal unit. This ensures almost unmanned processing of laminated glass. The benefits of cutting approx. 75 - 140 pieces with approx. 6 % less wastage and up to approx. 10 % higher edge quality constitute the basis of this system solution for the automatic cutting of laminated glass. The reduced need for qualified personnel and the high level of work safety, system availability and simple operation are additional guarantees for efficiency.

WHAT ARE THE SPECIAL ASPECTS OF THIS LAMINATED GLASS CUTTING SYSTEM SOLUTION?

The laminated glass cutting solution with two VSL-A systems is manufactured using the latest and most modern components from LiSEC. The heart of this solution for laminated glass cutting lies in dynamic load balancing (DLB). The dynamic load balancing (DLB) collects and processes data in real time from the entire system. The production volume is automatically distributed to the two laminated glass cutting bridges based on this in order to ensure ideal load utilisation for the respective cutting optimisation. This can reduce the throughput time and increase the cutting output per hour.

WHAT ADDITIONAL BENEFITS DOES THIS LINE OFFER?

When developing this laminated glass cutting solution, LiSEC placed special emphasis on a space-saving and compact design. The arrangement of the laminated glass cutting bridges in a row allows this production line to be arranged in parallel to a float glass cutting line and both lines to be supplied with a compact glass storage – and all this with minimal

space requirements in the production hall. This laminated glass cutting from LiSEC with VSL-A technology represents an ideal expansion of production capacities, especially for insulating glass manufacturers who need to respond to the rapidly increasing demand for laminated glass, while at the same time reducing operating costs by saving on wastage and personnel.

FOR WHOM IS THIS CUTTING SYSTEM SUITABLE?

This system is intended for both medium-sized businesses and large industrial operations. Depending on the design, a cutting capacity of approx. 75 - 140 pieces of ready-cut laminated glass sheets per hour can be calculated. The optimal solution for small businesses is to start with a VSL-A type laminated glass cutting bridge. It is possible to add a second laminated glass cutting bridge – and therefore upgrade to a laminated glass cutting system solution with dynamic load balancing (DLB) – at any time.

WHY IS THIS SOLUTION SO INTERESTING, ESPECIALLY WHEN IT COMES TO THE SHORTEST CYCLE TIMES?

LiSEC is offering a patented and unique option on the market, especially for highly automated insulating glass processing companies with particularly short throughput times and two- and three-shift production. The optional "Tandem cutting" version can be used to run the second laminated glass cutting bridge for cutting up

to two sub-plates at the same time. Especially for series production with a multitude of identical sheets. The simultaneous cutting makes it possible to cut up to approx. 140 pieces of laminated glass fully automatically and virtually without manpower.

THE HIGHLIGHTS

- Fast and flexible cutting of laminated glass, up to approx. 75 - 140 pieces per hour
- Flexible and efficient thanks to dynamic load balancing (DLB)
- Up to 10 % higher edge quality and accuracy with shortest cutting time

STANDARD FUNCTIONS

- Fully automatic 20 mm cutting, breaking and separating possible on all four sides of the raw dimension
- Glass thickness 22.1 (4.38 mm) to 1010.12 (24.56 mm) as standard
- Laminated glass cutting of X, Y and Z sub-plates
- Automatic sub-plate turning up to 2,000 mm sheet length
- Version with patented Selective Infrared Heating (SIR) for especially fast and protective heating of the PVB-foil (4 s heating time with 44.1 laminated glass)
- Automatic off-cut disposal of up to 300 mm in a container for broken glass
- Innovative operating concept with comfort and sport modes for ideal adaptation to the day's production
- Extra high level of work safety thanks to permanent monitoring of the work surface with laser scanner for maximum system safety
- Version with dynamic load balancing (DLB) for up to 75 cut sheets per hour





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ATS XTREME PROFILE CONVECTION

ATS 4.0 is the series of furnace for tempering architectural glass that includes all Mappi International technology: their use guarantees great production results and quality thanks to innovative solutions that meet the most demanding market standards.

This tempering furnace has been designed for medium and large glassworks, which want to add an extremely flexible and efficient machine into their production. Some of the features that make each ATS 4.0 furnace unique:

- **Minimize the tempering cycle and maximizes productivity:** ATS 4.0 guarantees high production volumes, as set-up times for each workload are nearly zero. Equally important, the time required to cold start the tempering furnace is minimized to just an hour. This translates into many more production hours saved each year which, when multiplied by the lifetime of the Mappi furnace (estimated at least 20 years) - best expresses its superb production efficiency.
- **GHBS Xtreme Profile Convection:** Real Convection, top and bottom, is the State of the Art in Convection Systems allowing reliable processing of "Low E" glasses down to 0.01. The new GHBS Xtreme Profile Convection was developed following an in-depth study on the upcoming coated glass that will be soon on the market. There is precise control of convection air distribution in the upper and lower heating chambers separately.
- **Extraction of the heating chamber :** allows maintenance operations quickly and efficiently.
- **ATI Active Thermal Insulation:** No energy loss thanks to **Hi-Tech 350mm State of the Art Insulation.** The furnace is perfectly insulated thanks to excellent insulation materials and state-of-the-art construction - so much so that you can even touch it with your hands while it is in operation.
- **Energy saving:** Thanks to the coordinated use of software solutions (such as MHS, ESS, IHS etc.) the furnace only heats up to the right temperature in the area where the glass is located. Here energy saving can be up to 40%.

- **Advanced Cooling:** a new quench cooling nozzle design and a new angle empathize the already very low anisotropy and iridescence of the glass.
- **Use of the best components on the market:** we use the best components and the latest technology to be unrivalled in quality and product life cycle. This is also great for the customer who can source components from any market.
- **First in the glass industry to be appointed "POWERED BY SIEMENS":** all Mappi tempering furnaces are certified "Powered by Siemens", ready to be integrated with a potentially infinite number of software applications compatible with Siemens MindSphere, and to communicate in real time with other machines and with the Company Management, Logistics, Maintenance and Planning.
- **Safety first:** Mappi furnaces do not use SO₂, a material that is harmful to the health of the workers and the furnace. In fact, being dangerous and corrosive, the use of SO₂ causes the deterioration of the rollers handling the glass and makes it necessary to stop the machine for maintenance every 15 days.
- **Made in Italy:** Completely manufactured at Mappi's Cisterna di Latina headquarters
- **SUPERTEMPER™**



| LOADING AREA | 1500x3800 | 1800x3000 | 1800X3800 | 1800X4200 | 2200X3800 | 2200X4200 | 2500X4200 | 2500X5000 |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|
| mm | 1500x3800 | 1800x3000 | 1800x3800 | 1800x4200 | 2200x3800 | 2200x4200 | 2500x4200 | 2500x5000 |
| inches | 60x150 | 70x120 | 70x150 | 70x165 | 86x150 | 86x165 | 98x165 | 98x196 |
| thickness | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm |

MTH



Furnaces MTH series, designed for those who have to manage large load volumes and process very large slabs without sacrifice quality, flexibility, energy savings. MTH has a maximum load floor of 3300 x 6000 mm, a true "giant". Such a large furnace demonstrates even more what it means to have the exclusive Mappi solutions that allow you to obtain excellent results and the maximum optimization of energy.

Last but not least new MTH is really beautiful, its angular lines, highlighted by LED lights, have a charm that had never before been seen in glassworks.

- **Minimize the tempering cycle and maximizes productivity**
- **GHBS Xtreme Profile Convection**
- **ATI Active Thermal Insulation**
- **Energy saving**
- **Advanced Cooling**
- **Use of the best components on the market**
- **First in the glass industry to be appointed "POWERED BY SIEMENS"**
- **Safety first**
- **Made in Italy**

| LOADING AREA | 2500X6000 | 2700X5000 | 2700X6000 | 3300X6000 |
|--------------|------------|------------|------------|------------|
| mm | 2500X6000 | 2700X5000 | 2700X6000 | 3300X6000 |
| inches | 98X236 | 106x196 | 106X236 | 130X236 |
| thickness | 4 to 19 mm | 4 to 19 mm | 4 to 19 mm | 4 to 19 mm |

FOX SERIES

Fox is a series of compact tempering furnaces, with loading dimensions starting from 1050x2300 mm, designed for medium and small glass processing companies. The Fox series has the most advanced features offered by technology in the industry.

Some of the features that make each Fox series furnace unique:

- Minimize the tempering cycle and maximizes productivity
- GHBS Xtreme Profile Convection
- ATI Active Thermal Insulation
- Energy saving
- Advanced Cooling
- Use of the best components on the market
- First in the glass industry to be appointed "POWERED BY SIEMENS"
- Safety first
- Made in Italy
- SUPERTEMPER™



| LOADING AREA | 1050X2300 | 1250X3200 | 1500X3200 |
|--------------|------------|------------|------------|
| mm | 1050X2300 | 1250X3200 | 1500X3200 |
| inches | 41X90 | 49X126 | 60X126 |
| thickness | 3 to 19 mm | 3 to 19 mm | 3 to 19 mm |



SUPERTEMPER™

SUPERTEMPER™ the latest technical solution we have developed to meet a precise market requirement for fire-resistant glass (Certified E30). The higher mechanical resistance required for this type of glass (160 MPa) led us to study a unique and innovative solution.

Thanks to **SUPERTEMPER™**, through the use of a different management of heating and cooling phases, anyone with a MAPPI furnace will be able to:

- Enter a niche market with high profit margins.
- Offer fire resistant glass with the same production costs of normal tempering.
- Open new commercial horizons as this type of glass is making its way into a wide range of applications (Construction and Interior Design)

All this without adding boosters or compressors, changing the layout of the furnace or needing more electrical capacity.

HST

The heat soak test is used to minimize the risk of spontaneous breakages of heat-treated glass caused by nickel sulfide inclusions. In this process, glass panels are placed inside a chamber and subjected to a furnace temperature of 290°C for two hours (with a tolerance of $\pm 10^\circ\text{C}$) to accelerate the expansion of the nickel sulfide. This causes the glasses containing nickel sulfide inclusions to break in the heat soak chamber, thus reducing the risk of potential in the field breakages. The full heat soaking process involves testing all glass in order, virtually eliminating any possibility of nickel sulfide breakage. Heat soak testing is recommended for all tempered glass intended for outdoor applications subject to variable temperatures. It is not normally required for interior applications.

The furnace is manufactured in accordance with European standard EN 14179-1.



MARPOSS



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MAESTRO

MAESTRO™ is a flexible, non-contact robotized solution that measures the shape, edge and thickness of any type of glass in a single sweep. The measuring head integrates several types of sensors and technologies to inspect all glass characteristics simultaneously.

High metrological characteristics: $\pm 50 \mu\text{m}$ of repeatability and $\pm 25 \mu\text{m}$ of localisation ensure a highly accurate measurement. MAESTRO can perform fast measurement cycles. It is suitable for both laboratory and production environments and can be customized according to the application requirements (i.e. number and model of robots).

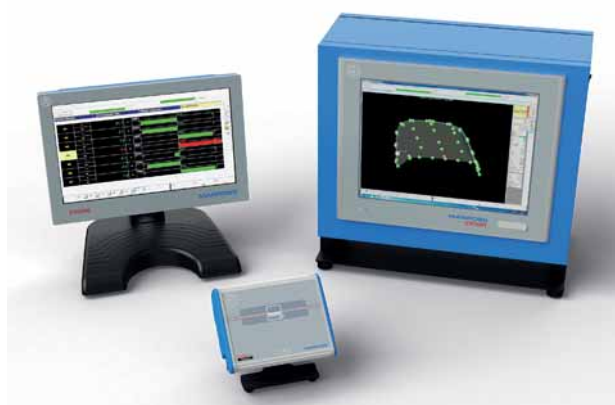
BENEFIT

- Fast cycle time
- Creation of part programs from the 3D drawing of the glass
- Robot trajectory is automatically defined by the part program and is always perpendicular to the glass surface
- Automatic part program selection
- Glass positioning error-free thanks to the automatic alignment of the robot on the measuring fixture
- Master integrated into the fixture
- Data collection and statistical analysis
- One software to manage both contact and non-contact sensors
- Taylor made solutions



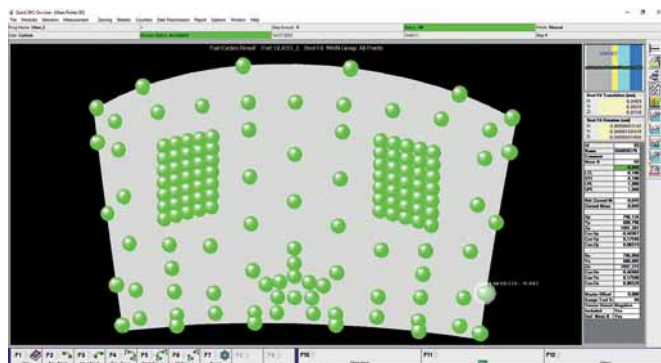
E9066™

E9066™ line of Industrial Computers is designed from the ground up to withstand harsh working environments and day-to-day operational abuse. Fanless, maintenance-free industrial PCs housed in factorytested enclosures ensure the durability and reliability needed to meet any factory requirement.



QUICK SPC™

QUICK SPC™ is a suite of software products designed to comply with any SPC / Quality Control requirement, ranging from simple measurement acquisitions to complex gauging applications. It can manage all types of sensors. Framed in a simple, wizard driven, common user interface it is possible to complement the base product by means of software Add-ons. The Glass ADDON quickly and intuitively displays the measurement made on the glass thanks to the ability to import the 3D file. The Best-fit algorithm overcomes the incorrect positioning of the glass on the measuring fixture. Measurement elaborations (rate-of-change, attack angle, etc.) can be easily implemented and displayed in dedicated pages.



CL-MG / OP / ENDO™ chromatic confocal sensors

Are the lines of optical sensors we can offer to meet any application requirement. Different body diameters (including 8mm for use in existing fixtures) and a huge mix of measuring ranges ensure that the right combination can always be found to measure any type of glass.



ZENITH™

ZENITH™ is the new reference in chromatic confocal controllers adapted to industrial environments. Based on standard Ethernet communication, it enables high-precision measurements. The non-contact technology ensures that the part is not scratched or moved during the measurement cycle. Available with 1 or 2 channels, blind or with display, it can measure all types of surfaces and materials, including reflective surfaces



LIGHTMASTER™

LIGHTMASTER™ is a multi-channel modular controller for chromatic confocal sensor heads. It is available in two versions 16 or 48 channels with modules (lightslots) with 4 channels inputs. LIGHTMASTER 48CH is a 19" 3U rack with a universal Ethernet GigE® interface compatible with PC or PLC.



NCG™

NCG™ is a thickness gauge based on interferometric technology using an infrared light source. The gauge has been designed to control the thickness of various types of parts, glass, plastics and foils. NCG is a high-speed gauge that can be connected to any machine for accurate and fast part thickness control.



www.marposs.com

MARPOSS



REDCROWN2™

REDCrown2™ is the latest generation of pencil probes, designed to provide the highest level of metrological performance in any application. The compact shape, measurement accuracy, sturdy design and easy clamping make this type of sensor the basic element for creating customized solutions. The ultra-soft touch version with 0.05N measuring force and plastic contact is the ideal solution to avoid scratches and glass deformation during measurement.



GAGEPOD™

GAGEPOD™ is a modular distributed data acquisition system designed for simple manual gauging to fully automated measurement and inspection systems.



DIGICROWN™

DIGICROWN™ is a modular system that can be configured in networks. It can be connected to PC and PLC via Ethernet interface. The modularity of the system makes this product ideal for any application layout.



ALL-IN-ONE MEASURING STATION

ALL-IN-ONE MEASURING STATION combines all the elements (sensors, interfaces, industrial PC, measuring software, pneumatic circuit) in a single cabinet that is easy to manage and move. It is suitable for both 100% in-line inspection and laboratory use. It can be customized with dedicated commands, keyboards, lamp indicators, etc.





MARVAL

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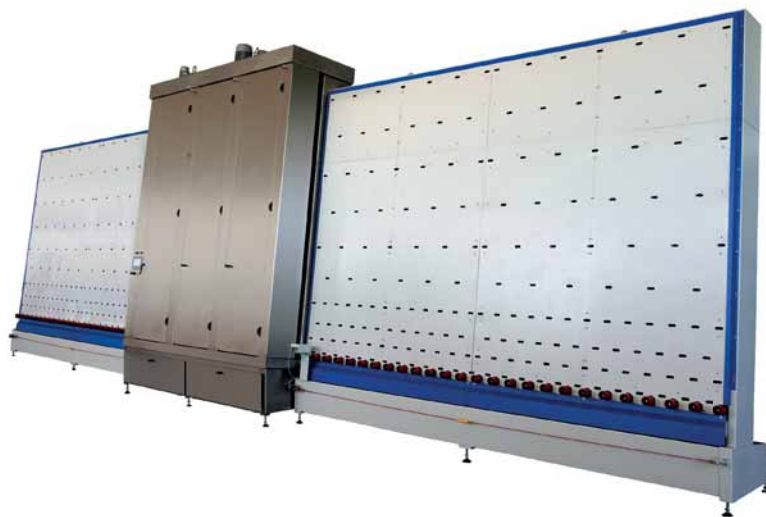
PANEL PRESSES

Marval panel presses allow to couple and press double and triple glasses thanks to the action of two panels, one fixed at the rear and the other, movable, at the front.

These are fully automated solutions, managed by plc and equipped with a convenient touch-screen panel from which it's possible to control the entire process, view and diagnostics of each work cycle and set the values of all machine function quickly and easily.

The machine is equipped with:

- Automatic infeed frame with special reference bars for precise positioning of the butylated frame;
- "coupling body" and press capable of producing double-glazing up to 80 mm thick;
- Cleaning and maintenance facilitated by the possibility of opening the front movable table;
- Outlet foldin table or conveyor.



WASHING MACHINES

The vertical washing machines "made in Marval" are the best the market has to offer today in the glass washing sector, thanks to a particularly solid structure and brushes with large diameter. These machine boasts a solid structure, which is indispensable to guarantee high production on shifts from 2 to 50 mm thick.

The motorization of the drive and brushes is entirely located in the upper part; the inner part is made of stainless steel, the same material used for the three tanks equipped with pumps. These washing machines are structured in three sections: inlet, washing body with fan and outlet.

The Marval washing machines - available in 1,600, 2,000, 2,500, 2,800 and 3,200 mm versions - are fully motorized and the speeds are adjustable with inverters up to 10 meters per minute. The process could be fully automatic and easily managed thanks to a plc with touch-screen.

AUTOMATIC SEALING ROBOT

The automatic sealing robot designed by Marval performs the final sealing of rectangular insulating glass panels, previously laminated and pressed, ensuring perfect corner sealing and maximum speed.

A chain transport system, separated with dowels supporting the glass, prevents contact with the sealed parts, while a front suction cup allows precise and correct movement of the glass. The sealant is fed through a hydraulic extruder supplied with the machine.

A numerically multi-axis controller allows programming and control of every step of the process.





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TP COMPACT

Try to imagine a glass tempering machine so compact that it can enter in a small glassworks.



It shall let the owners of the business to manage the whole tempering productive system without outsourcing it. This machine is so **efficient** and **adaptive** that it can guarantee you the best quality on the market combined with the **lowest energy consumption** of the category. Now try to imagine that you can use this machine whenever and however you want and also you do not need to be an engineer or a specialized technician.

To use this machine proficiently, you just need to handle a user-friendly touch screen interface as you do every day with your smartphone.

We are pleased to introduce you the new **Mazzaroppi TP Compact**. The result of the experience and the hardworking of our creative atelier, is just the tempering machine you always wanted and even more. The new Mazzaroppi TP compact, **is the first tempering machine** which is specifically designed and built to offer to our customers who are owner of a **small-medium glassworks** and want to reach the following goals:

- **Internalizing the tempering productive process**
- Combining the improving of the **quality** of the final product and the **lowest price** of the market
- Tempering their own glasses with an **average consumption of 100 kWh**
- Streamlining and speed up the whole manufacturing process without upsetting your business structure.
- Providing a fast and timely service to the customers.

| Model | Loading area | Minimum dimensions | Thickness | Plant dimension | Avarange consumption | Load/hour |
|---------|-----------------------------------|---|------------------------------|---|----------------------|-----------|
| | mmxmm | mm | mm | mt | kWh | 4mm |
| TP 130L | 1300x3200(3600) mm 51x125 inch | Ø 200 mm 7,87 inch 140x140 mm 5,5x5,5 inch | 3.8-19 mm 5/32 - 3/4 inch | 17,15 x 5,8 x 4,2 mt 56 x 19 x 13 ft | 100 | ≈20 |
| TP 160 | 1600x3200(3600) mm 60x125 inch | Ø 230 mm 9 inch 160x160 mm 6,30x6,30 inch | 3.8-19 mm 5/32 - 3/4 inch | 18 x 6,13 x 4,6 mt 60 x 20 x 15 ft | 130 | ≈20 |
| TP 190 | 1900x3600 mm 74x141 inch | Ø 230 mm 9 inch 160x160 mm 6,30x6,30 inch | 3.8-19 mm 5/32 - 3/4 inch | 18,75 x 6,5 x 4,6 mt 61 x 21 x 15 ft | 170 | ≈20 |

TP ADVANCED

Tp advanced is a tempering machine for processing flat glass. It has been specifically designed for **medium-big glass making companies** which produce glass panes for different fields (furniture, architectural glass, household appliances, shower stalls and automotive glasses). This machine has been built for those glassmakers who are planning to buy a tempering oven for reaching the following goals:

- **Cutting the energy cost up to 70%**
- Increasing the productivity
- Increasing the **quality** of the final product
- Streamlining and speed up the whole manufacturing process.

The machinery has a minimum size of 1900mm x 4200mm and a maximum size of 3200mm x 6000mm.



Thanks to the “Ultimate Convection” a Mazzaroppi Engineering patented system, this machine can process every kind of hardenable glass with a thickness by 2,8mm up to 19mm, including the Low-e glasses which have emissivity e=0,01. TP Advanced, can also be customized in many ways according to the requirements of individual customers in order to let them to meet their needs.

We are going to offer you the best technical option that can guarantee you the **highest level** of performance with the **lowest energy consumption** of the glass field.

| Model | Loading area | Minimum dimensions | Thickness | Plant dimension | Consumption | Load/hour |
|---------|------------------------------|--|---------------------------|--|-------------|-----------|
| | mmxmm | mm | mm | mt | kWh | 4mm |
| TP 1942 | 1900x4200 74x165 | Ø 230 mm 9 inch 160x160 mm 6,30x6,30 inch | 3.8-19 mm 5/32 - 3/4 inch | 21 x 5,5 x 3 68 x 18 x 10 ft | 200 | ≈20 |
| TP 2242 | 2200x4200 mm 86x165 inch | Ø 250 mm 9,84 inch 175x175 mm 6,89x6,89 inch | 3.8-19 mm 5/32 - 3/4 inch | 21 x 5,8 x 3,4 mt 68 x 19 x 11 ft | 230 | ≈20 |
| TP 2550 | 2500x5000 mm 86x165 inch | Ø 260 mm 10,24 inch 185x185 mm 7,28x7,28 inch | 3.8-19 mm 5/32 - 3/4 inch | 24,35 x 6 x 3,5 80 x 19,5 x 12 ft | 330 | ≈20 |
| TP 2851 | 2800x5100 mm 110x200 inch | Ø 280 mm 11,02 inch 198x198 mm 7,79x7,79 inch | 3.8-19 mm 5/32 - 3/4 inch | 26,7 x 6,2, x 4mt 85 x 20 x 13 ft | 370 | ≈20 |
| TP 3162 | 3100x6200 126x244 inch | Ø 350 mm 13,77 inch 250x250 mm 9,84x9,84 inch | 3.8-19 mm 5/32 - 3/4 inch | 28,7 x 6,6 x 4 mt 94 x 21,6 x 13 ft | 550 | ≈20 |

T+C (TEMPERING AND BENDING MACHINES FOR FLAT GLASS)

The tempering and bending machine for flat glasses have always been one of the **flagships of the Mazzaroppi's product portfolio**, as demonstrated by the **several machines installed** all over the world.

This range of product needs a very deep and **accurate preliminary study** case in order to meet the specific productive needs of the customer.

In this way, every T+C machine is **tailored** to each individual customer.

The tempering and bending machineries can be of three different types:

- Transversal bending by means of rollers with regular radius and CNC-controlled.
- Longitudinal sector bending by means of rollers with regular radius and CNC-controlled.
- Bending by means of press with variable radius and CNC-controlled.

The target of this machines are all those companies that operate in the field of shower stalls, refrigeration, automotive, furniture, solar panels, architectural glass, household appliances.

These machines have been built for those glassmakers who are planning to buy a tempering oven for reaching the following goals:

- Cutting the energy cost up to 50%
- Increasing the productivity
- Increasing the quality of the final product
- Streamlining and speed up the whole manufacturing process.



| Model | Loading area | Minimum dimensions | Thickness | Max glass arrow | Min. bending radius | Plant dimension | Consumption | Load/h |
|-------------|--------------------------------|------------------------------------|------------------------------|-------------------|---------------------|-------------------|-------------|--------|
| | mmxmm | mm | mm | mm | mm | mt | kWh | 4mm |
| TCP 2212 2C | 2200 x 1200 mm 86 x 47 inch | 250 x 500 9,84 x 19,68 inch | 4 - 8 mm 5/32 - 5/16 inch | 300 mm 12 inch | 100 mm | 20 x 9,5 x 3,6 mt | 350 | ≈20 |
| TCP 2518 1C | 2500 x 1800 98 x 70 inch | 350 x 600 mm 13,77 x 23,62 | 4 - 8 mm 5/32 - 5/16 inch | 300 mm 12 inch | 100 mm | 15 x 10 x 3,6 mt | 380 | ≈20 |
| TCR 2212 2C | 2200 x 1200 mm 86 x 47 inch | 250 x 400 9,84 x 15,74 inch | 4 - 8 mm 5/32 - 5/16 inch | 300 mm 12 inch | 100 mm | 23 x 6,5 x 3,6 mt | 350 | ≈20 |
| TCR 2518 1C | 2500 x 1800 98 x 70 inch | 300 x 550 mm 11,81 x 21,65 inch | 4 - 8 mm 5/32 - 5/16 inch | 300 mm 12 inch | 100 mm | 14 x 7 x 3,6 mt | 380 | ≈20 |

CS

The bending oven CS allows to bend the glass resting on moulds by heat. A lot of shapes can be realized in order to differentiate the production. The oven consists of several workstation called "Box" in which are positioned the moulds and the related glass package.

The special features of this machine are:

- The ground of each Box is covered by heat proof metal grid which make it possible to walk on it.
- The height of the perimetral walls allows the moulding process to be carried out completely inside the box.

This limits any thermal shocks that may occur at the beginning of the cooling phase.

- Vision system: special portholes are positioned on the side of the box to check the laying of the glass on the mould during the heating process.
- Heating section: This module is mobile and moves on the boxes by means of special rails, so that the moulds that support the glass are not affected by any movement or vibration during positioning. The closing system of the heating section has been designed for reducing the friction to a minimum and therefore having a longer lifespan.

These machineries are designed for those companies that operate mainly in the architectural glass field and are planning to purchase a moulded glass bending system for the following reasons:

- Reducing the energy consumption
- Increasing the quality of the final product
- Simplify and speed up the entire production process
- Increasing their productive capacity.



The CS, moreover, like all the machines produced by Mazzaroppi, can be customised according to the customer's needs. In this way we can offer the best technical option that allows our customers to satisfy their production requirements with the lowest operating costs of the glass field.



HST: HEAT SOAK TEST OVEN

This oven is used for checking the tempered glass panes. The test consists in heating the glass panes up to 290°C ±10°C and then keeping those glasses at that temperature according to the European reference standards.

This oven uses an advanced temperature control system that allows it to regulate both the internal air of the oven and the real temperature of the glass panes.

At the end of each process the machine generates a detailed report like the ones the authority draws up at the end of the preliminary calibration test of the oven.

The heating system consist of several independent sections and each of them is equipped with its own resistor, thermocouple, a fan for the air circulation system and another set of fans for the cooling cycle at the end of the test.

Another important feature of this HST machine is the archive of all the reports generated at the end of the thermal tests in a printable format, so whenever you want you will be able to examine all the parameters of each test you run in the past and sharing this documents with your customers.

Thanks to all these special features Mazzaroppi HST fully complies the European standards for the heat soak test and offers an efficient and reliable solution.

CUSTOM MACHINERY

The special machineries are the **highest expression** of the **technology**, of the **creativity** and the **experience** of the **Mazzaroppi Engineering** in the field of the glass industry.

These are machines that have been designed from scratch, thanks to the joint venture between our skills and the specific needs of our customers.

In fact, these are **tailored machines** and even the single **detail** can be **customizable**.

The great international glass corporations often chose Mazzaroppi as partner to realize their projects.

Our technical staff cooperate with the customer for drawing up a technical specification that includes: the size of the machine, the maximum and the minimum size of the glass that can be processed, the capacity of the machine, which kind of process the machine will do or if the machine will be able to do more than one kind of process.

For example, one of the customised machinery made by Mazzaroppi Engineering is called **"Multifunction"** and was created from a specific customer request: the need to have a single machinery made up of several production lines to allow the customer to have a roller bending line, another die bending line and finally a line for flat tempering, in a "all in one" solution.

Another type of machinery we find in this section is that of furnaces with **several heating chambers**.

These systems with two or more independent heating chambers make it possible to **reduce the thermal shock** during the tempering process significantly, in order to obtain an **unrivalled quality** of the final product in terms of glass flatness, absence of optical distortions and, above all, a **97% decrease** in the phenomenon of **anisotropy**.

These machines are regarded by **Europe's largest glass manufacturers** as the only way to **achieve** the very **high quality standards** to which they aspire.

The machines in the "custom" section are suitable for those who **cannot find the best solution** for their production needs on the **market**, and therefore are looking for a **product designed exclusively** for their specific needs, unique in its kind.



LM

LM Revolution is the new glass laminating furnace patented by Mazzaroppi Engineering and indicated for all companies that need to produce laminated glass with different thicknesses. Laminated glass complements tempered glass in an important way, giving greater resistance to impact and safety against falling/shattering, given by the ability of glass to retain fragments even after breakage.

LM Revolution allows us to laminate 2 or more sheets of glass with one or more sheets of EVA plastic in order to achieve a higher degree of safety in full compliance with regulations.

With our **2 patented systems** we have a **higher speed** in the production cycle and we obtain a product with **low plastic spillage**.

With regard to this type of product, our team of engineers has upgraded the standard LM revolution model by creating the "LM Tower" oven, which offers, in addition to the features described above, the possibility of **optimising production** thanks to **two or more independent worktables**, capable of laminating different types of product at the same time.

| Model | N° Platform | Platform dimension | Glass dimension | Max weigh on platform | Machine dimension (LxWxH) | Power |
|-------------------|-------------|-------------------------------|-------------------------------|-----------------------|---|-------|
| | | mmxmm | mmxmm | kg | mm | kW |
| LM Revolution 1.1 | 1 | 1750 x 3400 69 x 134 inch | 1600 x 3250 63 x 128 inch | 200 | 2350 x 4300 x 1500 7,7 x 14 x 4,9 ft | 16 |
| LM Revolution 2.1 | 2 | 2200 x 3400 86 x 134 inch | 2050 x 3250 80 x 128 inch | 250 | 2450 x 4300 x 1500 8 x 14 x 4,9 ft | 30 |
| LM Tower 2.2 | 2+ | 2350 x 4350 92 x 171 inch | 2200 x 4200 86 x 165 inch | 500 | 4554 x 3000 x 2600 15 x 9,8 x 8,5 | 26+26 |
| LM Tower 2.2 | 2+ | 2750 x 4650 108 x 183 inch | 2600 x 4500 102 x 177 inch | 600 | 4850 x 3100 x 2650 16 x 10 x 8,7 | 35+35 |
| LM Tower 2.2 | 2+ | 3000 x 5000 118 x 196 inch | 2850 x 4850 112 x 190 inch | 650 | 5580 x 3470 x 2700 18 x 11 x 8,8 | 40+40 |



MOLE MORESCHI

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TOOLS FOR GLASS ONLY

The company started its activities 103 years ago, with artisan based production, and now has more than 75,000 different items in its product range.

We are probably the only company that produces diamond wheels exclusively for the glass sector and so we can certainly be defined as 'specialists'! In fact, our entire R&D, production etc., are focussed totally on glass and - in some cases - materials very similar to glass, aiming at supplying the complete range of glass grinding tools.



PERIPHERAL WHEELS

Mole Moreschi has invested a lot in the development of a complete and performing range of peripheral wheels.

In addition to the traditional, widely tested products, we have added new ranges capable of effectively covering all areas of use.

We have developed solutions and services able to support even the most demanding customers, we are today confident of being able to offer a highly performing product, capable of satisfying any type of need.



CUP WHEELS

Diamond and resin cup wheels Mole Moreschi has a very wide range of cup wheels among which you can surely find the most suitable tools for your machine and your specific processing. A wide variety of binders, grits, geometries are available, each of which can be completed with a specific fixing body for each individual machine model. In addition to domestic production, we also sell the polishing wheels of the main international manufacturers. Moreschi cup wheels are products of the highest quality, widely tested, known and appreciated all over the world.



POLISHING WHEELS

The polishing wheels were created to replace the felt wheels with cerium where management is much more complex; in fact, the management of a normal polishing wheel has no type when it is managed except to be replaced when the ability to use the wheel ends. In this area, then, the water must not be particularly hard and contain a saline concentration that must not exceed certain parameters.



ROUTERS

In addition to a complete range of products able to effectively meet the most common needs, in terms of speed, finish, durability, we offer "customized" tools, optimized to the specific needs of the customer. To the sintered tools we add tools with electroplated diamond, to offer solutions also to the requests of geometries not achievable with more traditional technologies (diameter 4,5)





NEPTUN Srl

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ROCK 10-45

Straight-line edger with 10 wheels, for flat edge, polished arrises and wide chamfer up to 54 mm with variable angle 0°÷45°. Neptun's line also propose Rock 14-45 with variable angle, Rock 8 and Rock 11.

Rock stands out for its extraordinary production speed combined with high precision and processing quality. The structure is fully made of cast iron and high thickness steel processed with innovative technological solutions aimed to maintain precision and reduce mechanical wear and thus maintenance costs. This also leads to an unprecedented low noise level. Many advanced and patented solutions, such as the conveyor pad in double material, the ETS squaring system and the RC-4 system for parallelogram shaped glass, are the result of a consolidated know-how and heavy investment in R&D.



ROCK 11 AWA

The Rock AWA version is added to the vertical straight-line edging machine segment, which now has automatic management of both diamond and polishing tools AWA (Automatic Wheels Adjustment), in order to guarantee constant quality and also be used by non-expert operators. AWA system is applicable to all Rock models.

Rock AWA allows:

- Automatic adjustment of diamond and polishing wheels
- Management of processing recipes in order to immediately set different sets of wheels which, require different settings: tool sets for standard glass, for laminated glass, or for small thickness



- Possibility of storing specific processing recipes
- The peculiarity of the AWA system is the hydraulic spindle management system without electrical and electronic components in the spindle area, with a water resistance class IP68, thus ensuring high reliability.
- Indication on the control panel of the need to replace a tool when worn
- Clear and accurate diagnostics with online troubleshooting guide

LV EVO

In the washing machine segment, the entry level range is now enhanced with the new LV EVO series which, while maintaining the simplicity of the well-known LV Top, it has a high level of automation and superior performance with processing speed increased by 50%.

The new peculiar features are:

- Machine body entirely in stainless steel and with base frame in hot-dip galvanized steel
- Touch screen with PLC for managing all functions
- Workable thicknesses 3 ÷ 30mm with automatic adjustment by means of an input thickness reading sensor
- Speed regulation 1 ÷ 8 m / min by inverter
- Brushes Ø140mm with 350 RPM speed (500 RPM with brush inverter option)
- Automatic water quality management and relative replacement

- PLC interface for in-line integration with other upstream or downstream machines via ethernet and production data export that can be integrated with Industry 4.0
- Energy consumption control with precise and graphic indication of the last 8hrs
- Available in 1600 Open Top, 2200 and 2600mm sizes.





WAVE HP

The main strength of Wave HP is its maximal flexibility of configuration. The entry-level Wave comes with a very robust structure, suitable for intensive processing. Controlled by PLC, this version can be enriched with several solutions, up to the full-optional model, Wave HP, for total automation and superior performances in all fields: output, washing quality, integration in business processes. In both cases, the construction and components ensure the highest reliability over time. Wave can meet the requirements of each specific production context, respecting the required level of investment.

Wave HP is equipped with a powerful touch screen control unit for managing machine functionality, remote diagnosis, scheduled maintenance and numerous innovative functions: **A-Qual** water quality control, **Ecosave** energy saving, **SmartSpeed** for differentiated speed management and optimal drying of the tail of the glass, **NightCare** for water heating pre-ignition and automatic water change programming out of order. Wave can be supplied in Heavy Duty configuration for Jumbo sheets up to 3.3 x 6 meters size and 80 mm thickness.

TORNADO HP

Tornado HP is ideal for intensive industrial processing where **maximum production efficiency** is required in terms of quality and speed. The total management, even remotely, of the production and maintenance parameters, makes it suitable for the Industry 4.0 environment. Tornado HP is equipped with a powerful PLC with touch screen that allows the management of numerous advanced functions, for glass with thickness up to 38mm and width from 1 to 3.3 meters. The high level of **automation and flexibility** places no limits on integration into all existing production lines of different manufacturers. Lamination, tempering, painting, screen printing, double edger grinding, all processes become smooth with Tornado washers.



QUICKLINE

QuickLine consists of two Quick modules combined according to the type of production required:

- QuickDrill with QuickMill to perform milling, drilling and countersinking on the entire work area, without any shadow area;
- QuickEdge with Quick2 to have a complete cycle of polished grinding, milling and drilling.

The Quickline has 3 working modes: in line for maximum productivity, in single mode with the processing of two different production batches simultaneously for maximum flexibility, or you can work with a single machine when the other has no work or is in maintenance, for maximum return on investment. Although there is an optimal working direction, glass loading / unloading can take place at any point on the line depending on the operator's needs of the day.

The Quickline can be combined with our wide range of vertical washing machines type LV or Wave and completed with loading and unloading automatic for an unmanned work island.

The investment is also flexible because the line can be completed in steps as production needs grow.



QUICK 2 T8

Quick2-T8 combines the drilling and milling phases in a single machine. All the advantages of the Quick series now also within reach of who, due to lack of space, cannot opt for the solution with the two units. Powerful numerical control with touch panel 15" for fast programming directly on board of the machine.

- DCS (Dynamic Control System): innovative tool management system for automatic management of the feed rate in function of the cutting capacity of the tool.
- High precision thanks to the system for measuring the effective position of the glass by means of a linear encoder, guaranteeing an accuracy of $\pm 0.15\text{mm}$ constant over time.
- Still glass milling, thanks to the solid glass locking system, the milling and grinding operations of the notches guarantee high quality and speed, up to 0.5
- Axes speed up to 30 meter/minute



- Available in sizes 160-30 or 280-45 for large glass sheets
- Brushes $\varnothing 140\text{mm}$ with 350 RPM speed (500 RPM with brush inverter option)
- Automatic water quality management and relative replacement
- Available in 1600 Open Top, 2300 and 2800mm sizes.
- PLC interface for in-line integration with other upstream or downstream machines via ethernet and production data export that can be integrated with Industry 4.0
- Energy consumption control with precise and graphic indication of the last 8hrs

QUICKMILL 100

The smallest three-axis machining center for milling, grinding and one side drilling. Quickmill 100 has as its primary processing the milling and grinding of notches and cut-outs, but is also able to perform holes with high quality finishing. Programming on the machine with a simple and fast CAD / CAM. Possibility of having the optional CAM WAY with over 1000 parametric shapes and the work station for programming in the office.

Derived from the famous best seller model Quickmill 160-30, despite being the entry level version for milling, it is designed with industrial solutions and a high degree of automation.

Compact and robust construction, the main features are:

- Automatic handling of the slabs
- Possibility of in-line insertion with upstream or downstream machines
- Maximum glass size 1800x3200 mm in open top configuration
- Workable dimensions 1000x2400 / 3200mm open top for 15 mm thickness
- Simple and parametric programming from touch screen
- Made mostly of stainless steel and galvanized steel.
- Convenient glass scrap extraction drawer





OPTRIS GMBH

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BOTTOM UP GIS 640I G7

High resolution Bottom up glass inspection system for process control in glass tempering machines.

Features

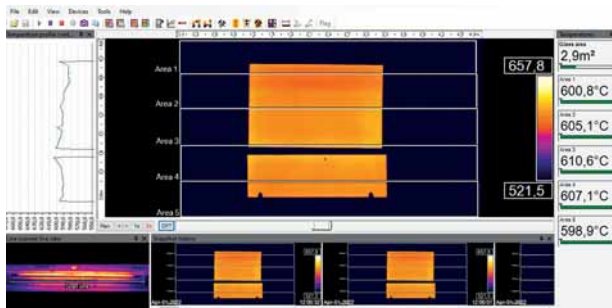
- Compact bottom up system for coating **independent** underneath measurement
- Excellent 1600 px resolution on maximum 4.3 m scan width (@ 90 cm distance)
- Integrated ultra-fast glass breakage detection combined with Digitally controlled lens protection system (DCLP)
- No cooling or air purge requirement
- Glass area calculation
- Pre-assembled system for easy installation on glass tempering furnaces



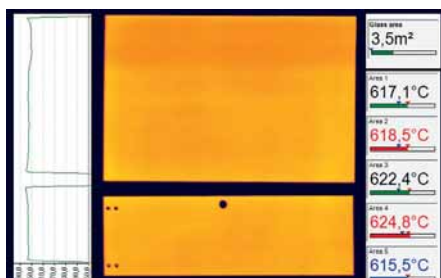
Scope of supply Bottom Up GIS 640i G7

- 2x PI 640i G7 imager with 90° or 60° FOV
- 2x Industrial Process Interface
- CTlaser 4ML glass breakage sensor with USB interface
- 2x DCLP Shutter system with mounting brackets for imagers
- 2x USB Server Gigabit
- Control cabinet with cable set (10 m each) and remote control box
- Software package
- 100-230 V AC/ 24 V DC power supply for initial start-up

Software PIX Connect



Exemplary software layout with thermal profile, IR live view, snapshot history, five measurement zones and glass area calculation.



The software provides excellent image quality and manifold analysis features as profiles, measurement areas and alarm indication.



www.optris.com



COOLINGJACKET ADVANCED

The universal protection for optris PI series, CTlaser, CSlaser, CTvideo and CSvideo under harsh industrial environments.

Features

- Operation at ambient temperatures up to 315 °C
- Water cooling with optional protective windows
- Modular concept for easy installation of different devices and optics
- Trouble-free sensor disassembling on site with quick release chassis
- Integration of additional components like PI NetBox, USB Server Gigabit and Industrial Process Interface (PIF) in extended version



CT G5

Precise noncontact temperature measurement of glass from 100 °C to 1650 °C.

Features

- Accurate temperature measurement of flat glass, container glass, light bulb manufacturing, car glass production and manufacturing of photovoltaic cells from 100 °C to 1650 °C
- Applicable up to 85 °C ambient temperature without cooling

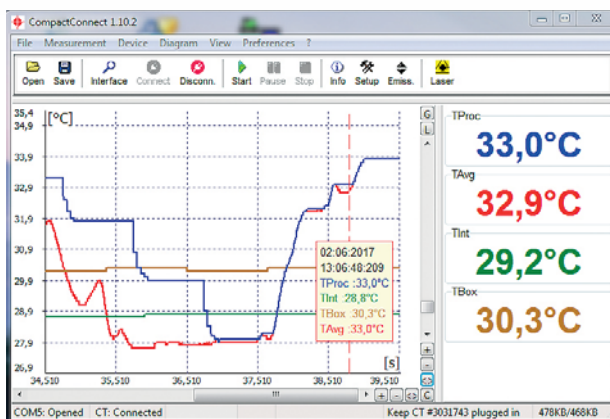


CTLASER G5

Infrared thermometer with double laser aiming for temperature measurements on glass from 100 °C to 1650 °C.

Features

- Precise temperature measurements on flat glass, container glass, light bulbs, car glass and solar panels
- Temperature ranges from 100 °C to 1650 °C, measurement fields from 1.0 mm and exposure time 10 ms
- Innovative double laser aiming for exact marking of measuring field
- Compact size of sensing head
- Suitable for ambient temperatures of up to 85 °C without additional cooling
- Cooling and protection accessories for rugged environments



www.optris.com



CTLASER G7

Non-contact temperature measurement of ultra-thin glass sheets from 100 °C to 1200 °C (212 °F ... 2390 °F)

Features

- Accurate temperature measurement of ultra-thin flat glass used for touch displays of smartphones, tablets etc.
- Double laser aiming for exact marking of measurement spot
- Optics 45:1 with selectable focus, compact sensor head size
- Suitable for ambient temperatures of up to 85 °C without additional cooling
- Cooling and protection accessories for rugged environments

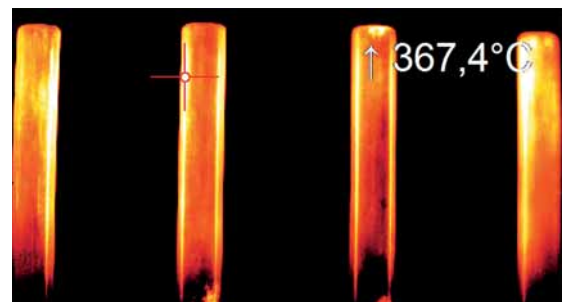
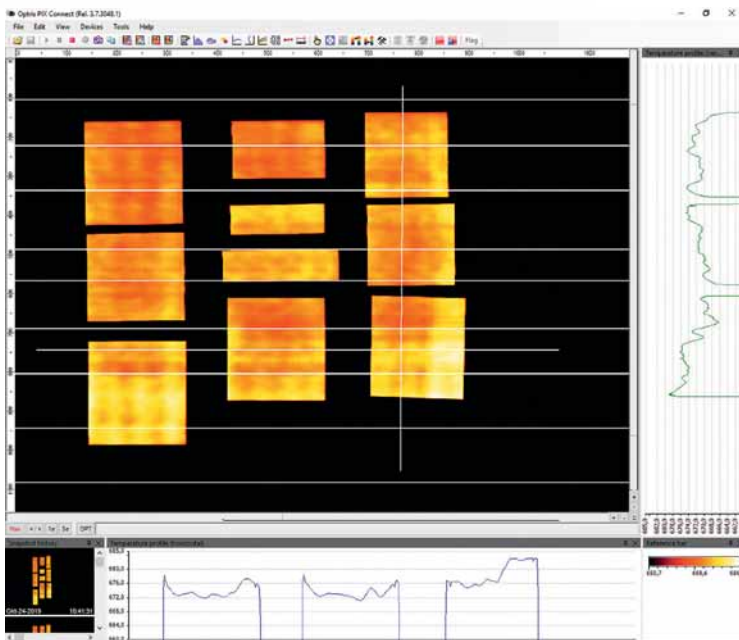


PI 450I G7

Thermal imaging solution for the glass industry.

Features

- Line scan function through license-free analysis software PIX Connect
- Compact in size of 46 x 56 x 68 - 77 mm
- Frame rate of 80 Hz
- Withstands ambient temperatures of up to 70 °C without additional cooling

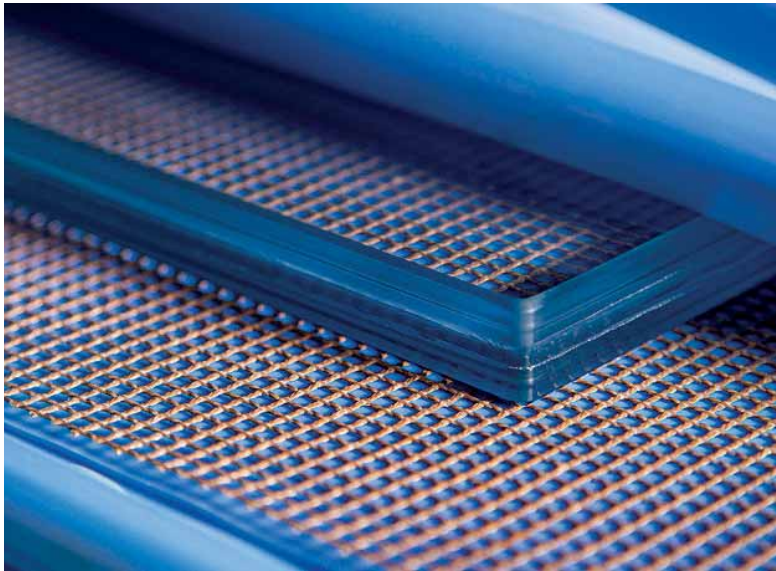




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RD CLEAN CONCEPT - PATENTED SYSTEM



Laminating furnaces in multiple combinations, customization and oversized dimensions



The innovative post-lamination, clean-edges system based on a laminating bag of last generation. It is a real system manufactured with special materials, selected to respond to a particular scope: to limit the excesses of the laminating interlayer from the glass edges after lamination.

This system provides several benefits in production among which:

- Saving time and labor by removing one step in lamination
- Safety of the operator who does not need to use sharp tools
- Installed in different kilns with excellent results

RIVA BY RCN

CHEMICAL TEMPERING FURNACES

"Riva by RCN" is a double winning solution if we consider the possibility of customizing the machines along with the technical expertise of Gianfranco Rivaroli who has, in fact, more than 40 years of top level professional activity

| Model | Active Size (mm) | Handling | KW |
|--------|------------------|-----------|--------|
| CT 320 | 700 x 450 | Manual | 16+6 |
| CT 330 | 700 x 450 | Automatic | 16+6 |
| CT 331 | 1000 x 1000 | Automatic | 39+12 |
| CT 900 | 2000 x 1000 | Automatic | 60+24 |
| CT 950 | 3200 x 2200 | Automatic | 100+40 |



'EASY CONNECT APPLICATION'

Latest generation man/machine interface:

- product process checked from smartphone, tablet or PLC
- exclusive FTP Cloud for automatic download of the daily production process
- chat and technical assistance with RCN from remote

In compliance with ASTM G 155-13" UNI EN ISO 12543-4:2011
 SGCC List Approved UNI EN 12600:2003
 AINSI Z 97.1-2009; CPSC 16 CFR 1201
 AINSI Z97.1-2015 Section 5.4.2



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GLASSLINE

ROLLERCOATER MACHINE FOR THE ENAMELING OF FLOAT GLASS EDGES

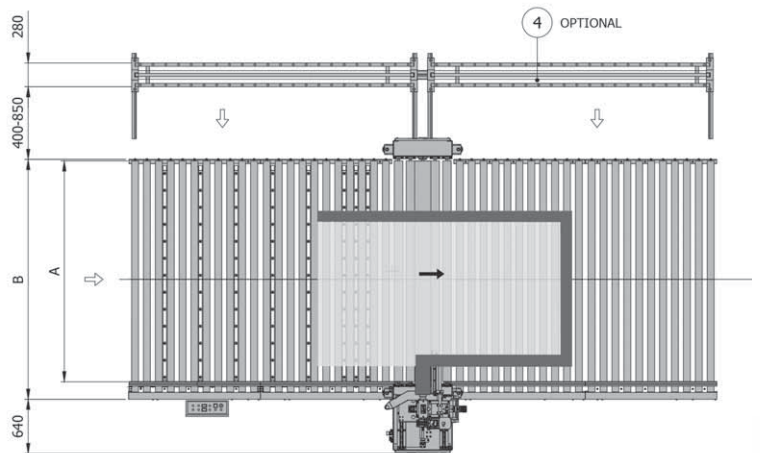
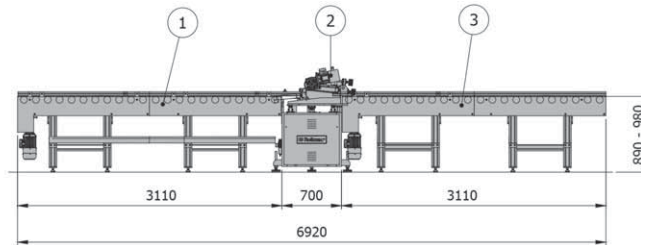
GlassLine is a machine based on the technologies of enameling the edges of float glass sheets by means of a reverse roller.

It has been designed in response to a special need of glasses for building and interior decoration, i.e. the coating of a frame on the four edges of the sheet. Frame sizes: min. 5 mm max. 300 mm.

This operation is performed in 4 passes with the return and 90° rotation of the sheet between one pass and the next. After all four sides have been processed, the sheet is sent to the oven for drying.

The machines grant enable to enamel sheets with thicknesses from 2 mm. to 25 mm. and sizes up to 2,600 mm. A constant and uniform quantity of enamel can be applied up to 400 g/sq.m. in a single pass. It is possible to coat by ceramic enamels and organic paints.

| Working Width |
|---------------|
| 1300 |
| 1800 |
| 2200 |
| 2600 |
| 3400 |



COLORGLASS

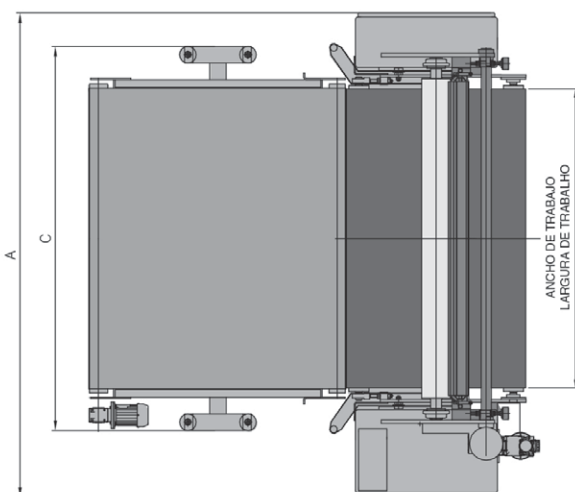
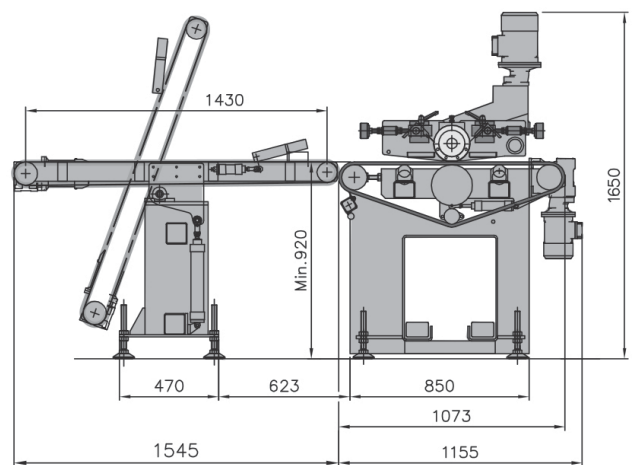
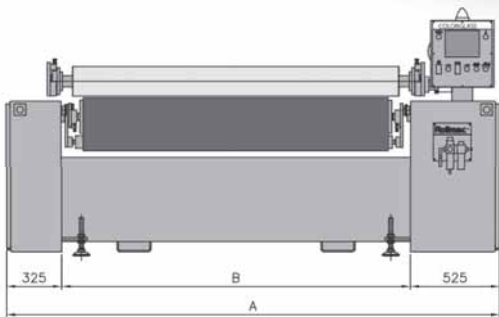
QUICKER AND EASIER ENAMELLING AND DESIGN PRINTING

COLORGLASS is the single-roller machine for the enamelling and design printing of glass sheets by means of an engraved cylinder. It is suitable from small dimensions such as tiles and decorations to big sizes such as internal walls, doors and façades.

Its single-roller design makes it particularly suitable for companies that work with large productions quantities and do not need frequent articulation changes.

With COLORGLASS it's possible to easily enamel and print any kind of flat glass on the market with sheet thicknesses from 2 mm to 25 mm and sizes from 600 mm to 2600 mm; in addition, it is the ideal working tool for in-house laboratory and production lines.

| Working Width |
|---------------|
| 600 |
| 1000 |
| 1300 |
| 1800 |
| 2200 |
| 2600 |





SATINAL SpA - TK - STRATO

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STRATO®



STRATO® is an **innovative, ductile and versatile** EVA film which finds application in architecture and interior design as well as in the photovoltaic sector. The insertion of coloured films or other materials (such as textiles, wire meshes, marble, etc.) in the assembly of the film interlayer and the glass plates allows to achieve chromatic and decorative effects.

In the architectural industry the use of STRATO® is **synonym of safety and security**. In case of glass breakage, STRATO® EVA glass interlayers avoid potentially harmful glass splinters.

In photovoltaic industry, it stands for innovation, protection and savings.

STRATO® cross-linking chemical composition allows the internal molecules to generate **tridimensional links**, thus guaranteeing an additional degree of protection for all architectural elements exposed to exceptional conditions – such as high temperatures, high humidity and weather extreme conditions.

Being applied between two sheets of glass, STRATO® EVA also offers a **full protection against UV-radiations** (over 99%), preventing interior furnishings from fading. **STRATO® EVA product range is also Carbon Free available.**

STRATO® glass interlayers product range:

STRATO® CLEAR

The highest degree of transparency for the architectural glass market.

STRATO® FROST

Different frosted finishings to perfectly blend into any architectural or interior design project.

Exceptional durability.

STRATO® BIRD FRIENDLY

The EVA interlayer that combines the benefits of laminated safety glass with a bird-friendly design.

Several patterns available.

STRATO® SOLAR CONTROL

Innovative high-performance EVA film. It eliminates UV and NIR energy allowing the highest visible light transmission.

STRATO® COLOUR

When it comes to design and total opacity, solid colours are the perfect solution. The range also offers transparent colours designed for contemporary times and to reflect global color trends.

STRATO® BIANCO

STRATO® NERO

STRATO® AZZURRO MEDITERRANEO

STRATO® BRONZO SICILIA

STRATO® GRIGIO DOLOMITI

STRATO® VERDE TOSCANA



STRATO® STRUCTURAL

Special structural interlayers that guarantee rigidity and post-breakage resistance.

TK

TK lines of glass laminating ovens are designed and manufactured to meet customers' requirements about quality standards, production volumes and cost efficiency. Laminated glass produced with TK glass laminating ovens features high-safety characteristics for a wide range of applications. TK ovens have a low energy consumption compared to the average of ovens produced and marketed internationally.

TK LAMIJET

Range features:

- self-tuning heating system with infrared resistances
- temperature control on many independent zones
- temperature control through thermocouples connected to a programmable thermo-computer
- hydraulic retractable loading and unloading lifter for space optimization
- support surface in aluminium sheet and silicone bags with quick closing system



TK BREVA

The design of Lamijet Brevia is the synthesis of technical knowledge acquired through years of design and construction of glass laminating ovens. The peculiarities of this system are the speed of lamination which allows to quickly meet any production requirement. With the new technology applied to Lamijet Brevia cycle times can be reduced by 50%. This oven is suitable for those customers who do not have high productive capacity but however want to keep an adequate production.

TK CONVECTION

Innovative laminating oven with convection heating system and fast cooling for high production volumes, interlayer flexibility and lower operating cost. The modular system allows quick and easy loading of the trolleys for laminating. Possible adjustment of the temperature with thermocouple connected to a digital temperature controller/PLC. Up to a maximum of 6 trays.



TK HST

The oven is manufactured in accordance with EN 14179-1 European standard. The presence of nickel sulfide NiS inclusions may cause the spontaneous breakage of the glass sheets after the tempering process. The Heat Soak Test is used to minimise the risk of these breakages of heat-treated glass.



TK CHEMICAL TEMPER

Automatic oven for the glass chemical temper with specific technical characteristics: electrical heating, programmable operator's panel, salt melting tank in stainless steel, power failure security system-UPS, pre-heating hood, electromechanical glass lifting system, maximum temperature 500°C.



TK SERVICES

| | | | | |
|---|--|---|---|---|
|  |  |  |  |  |
| DESIGN | ON-SITE CONSTRUCTION | INSTALLATION | TESTING | REMOTE TECHNICAL ASSISTANCE |

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WEB PUBLICATIONS



OFF. MECC. SCHIATTI ANGELO Srl

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After more than 50 years, we can say that Schiatti Angelo srl has a tradition as a manufacturer of machines for the glass processing. Over the years, it has acquired the necessary experience to manufacture innovative, reliable and quality machines.

The company's core business is the production of straight- and double edgers for the processing of the flat and pencil edges, as well as drilling machines.

EDGING MACHINES

The FPS range of vertical edgers is able to process the finest flat edges and arrisses. The most important part of these machines is the conveyor-track composed of rubber pads-bearings-chain that assure high performance in terms of glass holding and durability, without requiring continuous lubrication.

Some models are equipped with cerium oxide polishing on the edge and the arrisses for extra bright finishing, while all models are equipped with a PLC touch screen to adjust and display the machines' working parameters and diagnosis fault situation.



| | Wheels number | Min workable dimension | Max workable thickness | Max speed |
|-----------|---------------|------------------------|------------------------|-----------|
| Straight | From 4 to 13 | 45x60mm | Up to 90mm | 5 m/min |
| 45° miter | From 8 to 14 | 50x100mm | Up to 55mm | 5 m/min |

A wide range of optional equipment is available for machine customizing, including the automatic adjustment of the diamond wheels and Industry 4.0 solutions as to interconnection to remote control and maintenance.

DOUBLE EDGING MACHINES



Since 1969, main improvements have been made both in mechanical and software developments in order to enhance the machine's performances. In this age of 'digital manufacturing', Schiatti Angelo srl would like to highlight its Industry 4.0 solutions with particular attention on the BFT and BFP ranges of double edging machines. Complete lines can be integrated in smart factories production process. The software offered by Schiatti provide smart solution in order to optimize the production cycle and increase customer satisfaction by reducing operational costs and increasing productivity; thanks to the continue technological improvements and digitalization in manufacturing, it has been developed to improve automation machine-to-machine and human-to-machine.

| | Wheels number per side | Min /max workable dimension | Max workable thickness | Max speed |
|-----|------------------------|-----------------------------|------------------------|-----------|
| BFT | From 2 to 6 | 80 - 3000mm | Up to 12mm | 10 m/min |
| BFP | From 5 to 11 | 100- 4500mm | Up to 35mm | 10m/min |

DRILLING MACHINES

| | Max workable thickness | Max drilling Ø |
|------------|------------------------|----------------|
| Horizontal | 28mm | 3 - 200 mm |
| Vertical | 19mm | 3 - 40 mm |

Also the drilling is an important part of the Schiatti's production. The offered solutions are various in order to satisfy any customer's need; from the small/medium to large glassworks of furnishing, construction and photovoltaic sectors. In the drilling range you find drillers with opposite heads, multi heads drillers, drilling centres and vertical drilling/milling machines.





SCHIAVO Srl

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Washing Machines

Customisation, long working life and high quality have always been the features that make Schiavo washing machines stand out in the market. The company's range of glass washing machines includes vertical and horizontal machines, those for straight line grinders, as well as machines for special applications.

VERTICAL WASHING MACHINES

EASY is Schiavo's entry-level series of vertical washing machines, with good quality and an affordable price. These machines are suitable for small glassworks or low production runs, and are available with 4 or 6 brushes, and for maximum glass heights of 1,600 or 2,000 mm.

TOP is a high-quality range of vertical washing machines. These machines, made entirely in stainless steel, to process glass thickness from 3 up to 40mm, and glass heights from 1600 up to 3300 mm.

HYDRO is a no-compromise series of full-option, made entirely of stainless steel, to process glass thickness from 3 up to 40mm, and glass heights from 1600 up to 3300 mm. The HYDRO series is equipped with touchscreen, and can work in-line with vertical, work centres, drillers, as well as straight line millers and grinders. This machine adjust both speed and glass thickness automatically, depending on the previous machine. HYDRO washing machines are equipped with remote assistance and are Industry 4.0 ready.

HYDRO – Technical features

- High quality of materials
- High energy efficiency motors

- Long working life
- 24/7 intensive machine use
- Low maintenance
- Low noise levels
- Low water consumption
- High quality washing and drying

HYDRO



Horizontal glass washing machine HTL2600



HORIZONTAL WASHING MACHINES

HTL is Schiavo's series of horizontal flat glass washing machines, with structure and casing entirely made of stainless steel. The HTL series has been designed for intense production runs, ensuring high washing quality. This machine can work stand-alone and inline, such as, for example, in-line bilateral grinding, lamination lines and digital printing. HTL is available from 4 up to 8 brushes, glass width from 500 to 3,400 mm.

WASHING MACHINES FOR STRAIGHT-LINE EDGERS

The LVM400 washing machine can be installed on the output rack of any type of beveller or straight-line edger. This machine washes glass heights up to 400 mm, and is equipped with a fan to dry the glass sheets. This compact washing machine is the ideal solution to remove cerium from the glass immediately after polishing, without taking extra space.

SPECIAL WASHING MACHINES

FIRE is a series of washing machines designed especially for washing fire-resistant glass, which requires machines with special technical features. Schiavo is, and has always been, in the forefront in offering special machinery for all types of application.



www.schiavotech.it

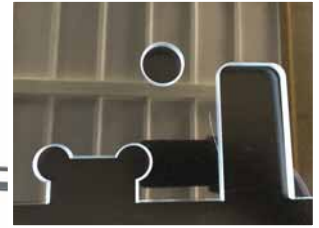
SCHIAVO
Italian technology

Vertical milling and drilling machine

FV1000

FV1000 is a CNC vertical milling and drilling machine, equipped with four CNC-controlled axes that enable any type of drilling, milling and countersinking operation on glass sizes of 200x1000 mm. This machine is equipped with an automatic response system, and includes a memory base of editable shapes.

With the optional for fast remove spindle you can change tools in 30 seconds, cutting wasted time and allowing faster and smoother operation while changing tools.



Storage systems

CLO

The CLO Series is a sideways-moving storage system available in manual or semi-automatic version and it could be made with countless racks according to customers' requirements. Sturdy anti-overturn system with underneath bearing allow it to operate even in case of unbalanced weight.

Vacuum lifters

LIFTER SERIES

Schiavo boasts a wide range of vacuum devices that cover many of the application where it's required a lifter. We have the fixed, manual operated, motorized or even the hydraulic one or manipulators. All of that to be able to supply to our customer, every single time, the perfect machine to do their job. Our machine are well designed and well produced, each one of our machine are tested before leaving our warehouse to ensure that each machine that goes to our customer are always perfect.



GEBI



SKILL GLASS Srl

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Vertical CNC Centers

SKILL E-D

SKILL E-D is the vertical CNC center for grinding, milling, drilling and polishing rectangular and shaped flat sheet glass. The machine can process both rectilinear and shaped flat sheet glass and combines all the technology for vertical drilling and milling with the features of a vertical grinding machine. Its main feature is its versatility, which allows for different types of processes at high speeds and optimal precision.



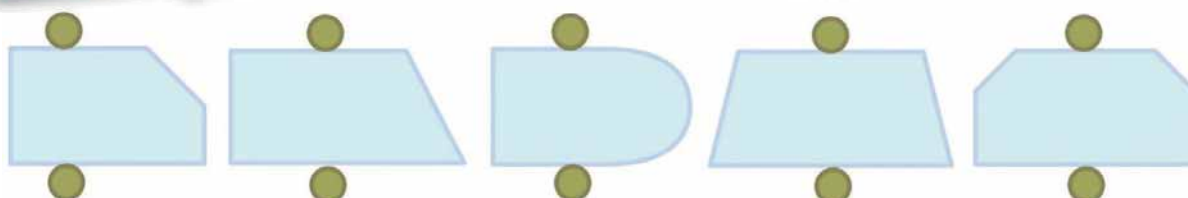
E-D 101

E-D 101 is the new vertical CNC center for grinding, milling, drilling and polishing flat sheet glass. This machine has all the technology of SKILL E-D but it is designed to process pieces with a thickness from 3 to 20mm. On these centers, the double working heads process the long sides of the pieces at the same time saving a lot of time on the grinding and polishing; The tool magazines, one rack of 10/12 positions for each working head, are placed in vertical columns close to the working head and allow a faster automatic tools change.

SKILL E-D and **E-D 101** work with 150mm diamond wheels grinders on sheet glass also laminated or treated. Polishing can be performed on large surfaces with 150mm wheels as well as on small inserts with diameters of 30 or 50 mm. Oppositely placed heads ensure drilling is at maximum speed with top quality

and precision, and countersinking can be performed with individual diamond tipped tools or with accessories mounted on the drill bits.

The vacuum belts system is one of the best advantages of these machines because, besides guarantees the drilling and milling without any limitation, it allows to work in continuous mode without idle time that is a big issue on the solution with a suction cups carriage that has to wait the unloading of the finished piece before to load the new one.



Drilling and Milling

DRILL 1600FF

DRILL 1600FF is a 5-axis CNC drilling and milling machine designed for producing holes, inserts and countersinks on rectangular flat sheet glass with a thickness of 3-20 mm. The machine is composed of five axes, X Y V Z W, and two electro-spindles which, as opposite drilling heads, create a double-sided drilling system that drills perfect holes.



DRILL 101FF

DRILL 101FF is a 6-axis CNC drilling and milling machine designed for drilling and milling in continuous mode on rectangular and shaped flat sheet glass. Thanks to his special vacuum belts system it guarantees a very high speed of the cycles and no limits on the drilling and milling because there are not the high limitations that the others systems has due by the presence of the suction cups where is not possible to make holes or notches. These vertical drilling and milling centers are able to operate with extreme speed and precision thanks to the management of all the processes by numerical control and also thanks to the support of the double tool change. The milling on this machine is a simple and quick operation and by using multiple tools can mill and grind an insert in just a few seconds like the polishing that can be carried out in small inserts with 50 or 30 mm grinders.



Grinding, Arrissing and Polishing

SKILL SFILL

SKILL SFILL is the vertical center for arrissing, grinding and polishing straight and shaped glass panes.

The machine is composed of nine axes and two electro-spindles mounted in parallel, allowing to process the pieces with two heads at the same time. Edging is done using diamond wheels with a diameter of 150mm and can be carried out on straight and shaped glass, including laminated or treated glass.

SKILL SFILL has the possibility to process pieces with different heights, widths and thicknesses without any intervention by the operator and with also the top quality of polishing achievable even with several passes and a different pressure of the polishing wheels on the glass managed automatically by the numerical control.





TALAMONI Srl

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WHEEL HOLDERS

Steel and metal wheel holders: our holders guarantee a perfect cut.

Talamoni holders are made of high quality metal alloy - precision worked and compatible with all cutting tables models. The right wheel and axes are in hard metal or diamond.

For Armatec, Bavelloni, Bottero, Bystronic, Hegla, Intermac, Laser Lisecc, MacoTec, Maver, Pannkoke, Tecnometal, Tuomas.



Hard metal and diamond wheels - totally "made in Italy".

Cutting wheels are available in a variety of different dimensions, cutting angles and grinds. A range of the most commonly used types is listed below. Other sizes and angle are produced to order.

For Bystronic, Bavelloni, Bottero, CMS, Hegla, Intermac, Lisecc, MacoTec, Maver, Pankoke Tecnometal, Tuomas, etc.

Wheel Holder Module with h.m.wheel

For Bystronic Bavelloni Bottero Hegla Intermac Lisecc MacoTec Pankoke Tecnometal Tuomas...



CSHM METAL HOLDERS WITH WHEELS

CSHM series: The new metal wheel holder can be used with all the cutting tables, that normally use the plastic clips. By using this product it is possible to optimize the cutting tolerance of your wheel due to it being more precise than a plastic model. The special wheel type in diamond are used to ensure a perfect cut whether its cutting straight, shape, laminated or float glass.

TALAMONI METAL CSHM HOLDERS ARE UNIVERSAL

Plastic coloured rings helps to identify the cutting angle of the wheel, we can supply it as a spare part as the axes.

The CSHM holder can be used on the following cutting tables: Bystronic Bavelloni, Bottero, Copmes, CMS, GFPMeccanica, Lisecc, MacoTec, Hegla, Tuomas etc...



PLASTIC HOLDERS WITH WHEEL (CLIPS)

CSM clips with hard metal wheels allow to work precisely and give outstanding results - float, laminated, shaped, stratified... This model fits all shapes and glass types to be cut.

CSM clips, made of high quality plastic to ensure wheel slide and ideal lubrication, have the further advantage of being colour-coded to identify the respective cutting angle.

The internal part of CSM wheels have a diameter of 5.8 mm, which is the perfect choice for all glass thickness.

CSM is suitable for Bavelloni, Bottero, Bolla, CMS, GFP Meccanica, Intermac MacoTec, Hegla, Tuomas, etc...



CUTTING FLUIDS FOR AUTOMATIC CUTTING

Use of the correct oil is essential to have the perfect cut.

The formation of dust and glass particles is an unavoidable part of glass processing. A cutting oil is the ideal solution to keep residual pieces of cut glass together. Using cutting oil does not only reduce dust formation, but also helps maintain the tension of the glass surface by entering into the cutting trace. The

oil helps keep the opening cut of the glass clean and safe.

Talamoni fluids are formulated to ensure perfect lubrication of your cuts, also giving longer life to your cutting wheels, by cooling and protecting them from erosion.

Choose from our four different types of cutting liquids

| | | |
|------------------|------------|---|
| T-OIL3125 | Slow | For straight and shaped cuts. Facilitates the opening of the cut and the removal of the glass does not damage washing machines. Maintains glass pieces while cutting, the wheels are cooled. Technical sheet of product T-OIL3125 |
| T-OIL3130 | Medium | For straight and shaped cuts in thick glass. Facilitates the opening of the cut and maintains glass pieces. Solid breaking edges thanks to its low surface tension. Synthetic bases and tension-decreasing substance, optimizing processing quality. Technical sheet of product T-OIL3130 |
| T-OIL3132 | Super fast | Synthetic bases and tension-decreasing substances, optimizing processing quality. Especially suitable for coated glass • evaporates after use without leaving residues • small glass particles are bound • low surface tension • for mirrors, patterned and float glass as well as painted or printed glass. Odourless, neutral to glass, residue-free. Technical sheet of product T-OIL3132 |
| T-OIL3133 | Fast | 100% evaporation, Appropriate for use in processing lines, (screen printing, automotive glass etc.) The low surface tension allows a better break and reduces the formation of small particles of glass. Technical sheet of product T-OIL3133 |

www.talamoni.com

Manual glass cutting: oil glass cutters

Talamoni's product range includes a selection of products for manual glass cutting.

Our hard metal tool production experience guarantees the quality of our manual glass cutters

Proper cuts requires cutting fluids – to open the cut more easily (the cutting fluid penetrates into the fissure) and to lubricate the wheel and axle.

Talamoni produces the following model of manual oil glass cutters



MANUAL CUTTING


The company produces a complete line of oil-reservoir cutters for manual cutting. Various models of oil-reservoir hand-held cutters with handles in blue or transparent plastic or blue or grey anodised aluminium all rigorously "Made in Italy".

Talamoni glass cutters are produced with wheels sharpened to different angles to satisfy diverse cutting requirements – the manual tools are destined for professional use in glassworks or artistic workshops.




EXAMPLE OF CUTTING WHEELS DATA


CUTTING WHEELS FOR: Bystronic, Bavelloni, Bottero, CMS, Hegla, Inytermac, MacoTec, Maver, Pankoke, Tecnometal and Tuomas tables

| | Wheel Part. No. | Ø x hole bore x thickness | Angle | Holder Part No. |
|---|-----------------|---------------------------|-------|------------------|
|  | RO5614R135 | 5.6 x 1.42 x 1.08 mm | 135° | CP4, T245 or B50 |
| | RO5614R140 | 5.6 x 1.42 x 1.08 mm | 140° | CP4, T245 or B50 |
| | RO5614R145 | 5.6 x 1.42 x 1.08 mm | 145° | CP4, T245 or B50 |
| | RO5614R150 | 5.6 x 1.42 x 1.08 mm | 150° | CP4, T245 or B50 |
| | RO5614R155 | 5.6 x 1.42 x 1.08 mm | 155° | CP4, T245 or B50 |
| | RO5614R160 | 5.6 x 1.42 x 1.08 mm | 160° | CP4, T245 or B50 |
| | RO5614R165 | 5.6 x 1.42 x 1.08 mm | 165° | CP4, T245 or B50 |


CUTTING WHEELS FOR: Bystronic, Bavelloni, Bottero, CMS, Hegla, Inytermac, MacoTec, GFP, Meccanica, Maver and Tuomas tables

| | Wheel Part. No. | Ø x hole bore x thickness | Angle | Holder Part No. |
|---|-----------------|---------------------------|-------|-----------------|
|  | RO6015R135 | 6.0 x 1.50 x 1.06 mm | 135° | CSH |
| | RO6015R140 | 6.0 x 1.50 x 1.06 mm | 140° | CSH |
| | RO6015R145 | 6.0 x 1.50 x 1.06 mm | 145° | CSH |
| | RO6015R150 | 6.0 x 1.50 x 1.06 mm | 150° | CSH |
| | RO6015R155 | 6.0 x 1.50 x 1.06 mm | 155° | CSH |
| | RO6015R160 | 6.0 x 1.50 x 1.06 mm | 160° | CSH |
| | RO6015R165 | 6.0 x 1.50 x 1.06 mm | 165° | CSH |

CUTTING WHEELS FOR: Lisec tables

| | Wheel Part. No. | Ø x hole bore x thickness | Angle | Holder Part No. |
|---|-----------------|---------------------------|-------|-----------------|
|  | RO5013R135 | 6.0 x 1.3 x 1.0 mm | 135° | T45 |
| | RO5013R145 | 6.0 x 1.3 x 1.0 mm | 145° | T45 |
| | RO5013R155 | 6.0 x 1.3 x 1.0 mm | 155° | T45 |
| | RO5013R160 | 6.0 x 1.3 x 1.0 mm | 160° | T45 |
| | RO5013R165 | 6.0 x 1.3 x 1.0 mm | 165° | T45 |

CUTTING WHEELS FOR: Bystronic, and Bottero tables

| | Wheel Part. No. | Ø x hole bore x thickness | Angle | Holder Part No. |
|---|-----------------|---------------------------|-------|-----------------|
|  | RO6016R127 | 6.22 x 1.60 x 3.05 mm | 127° | T255 |
| | RO6016R135 | 6.22 x 1.60 x 3.05 mm | 135° | T255 |
| | RO6016R145 | 6.22 x 1.60 x 3.05 mm | 145° | T255 |
| | RO6016R155 | 6.22 x 1.60 x 3.05 mm | 155° | T255 |
| | RO6016R160 | 6.22 x 1.60 x 3.05 mm | 160° | T255 |



TEXPACK Srl

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COD. 1204T TENACK SQUARE PACKING

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



COD. 1204CM TENACK KNITTED SLEEVES

Tenack sleeves are made by braiding AISI 316 L stainless steel wires. These sleeves, which withstand high temperatures and have excellent mechanical properties, are suitable for the glass industry as protection for parts that may come into contact with hot glass that is still soft, to prevent thermal shock and microcracks. They are an excellent substitute for Aramtex® products when temperatures exceed 350°C.

COD. 12010N ARAMTEX® DISCONTINUOUS FILAMENT TAPES



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

COD. 1203N PBI TAPES

PBI tapes are fire-retardant textile products made of PBI yarns, which are particularly suitable for high temperatures. To improve the use of this tape, a double-sided adhesive has been added, which helps to ensure correct positioning.





TRIULZI CESARE SPECIAL EQUIPMENTS Srl

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AUTOMATIC JUMBO WASHER 3400

This unit is able to process speed up to 20 m/min with thickness processable up to 50 mm

All our range of products includes the over 10 advantages of Triulzi machines:

- Safety first as it is equipped with safety immaterial barriers and fences where required
- Top reliability even across 3 shifts
- Long Lasting as entirely made of stainless steel
- Reduced maintenance as well as an easier inspection through a motorized stroke up to 500 mm
- Low Noise Level within the standards
- Easy to use thanks to ergonomic panel and ordinary maintenance guide
- Low energy consumption as equipped with suitable material to keep warm water inside the tanks and fan energy start-stop
- Low water consumption through a consolidated system control to minimize in autonomy waste of water following setted parameters
- Maximum configurability for stand alone and inline solutions integration
- Versatility beyond limit always ensuring the high quality and drying results
- Increased productivity is guaranteed at high speed with any idle time



MINI WASHER 350

The cute version of washers for very small glass 50 x 50 mm

As well as the sister machinery **TOSCANA.1000** for small glass 100 x 50 mm



Polishing washer for special application pre coating

CRYSTAL MUNDUS

Equipped with ultrasonic bath section and "patented" scrubbing system All our range of products includes the over 10 advantages of Triulzi machines:

- Safety first as it is equipped with safety immaterial barriers and fences where required
- Top reliability even across 3 shifts
- Long Lasting as entirely made of stainless steel
- Reduced maintenance as well as an easier inspection through a motorized stroke up to 500 mm
- Low Noise Level below the standards
- Easy to use thanks to ergonomic panel and ordinary maintenance guide
- Low energy consumption as equipped with suitable material to keep warm water inside the tanks and fan energy start-stop
- Low water consumption through a consolidated system control to minimize in autonomy waste of water following setted parameters
- Maximum configurability for stand alone and inline solutions integration
- Versatility beyond limit always ensuring the high quality and drying results
- Increased productivity is guaranteed at high speed with any idle time



Automatic high-speed washer

VT3

All our range of products includes the over 10 advantages of Triulzi machines:

- Safety first as it is equipped with safety immaterial barriers and fences where required
- Top reliability even across 3 shifts
- Long Lasting as entirely made of stainless steel
- Reduced maintenance as well as an easier inspection through a motorized stroke up to 500 mm
- Low Noise Level below the standards
- Easy to use thanks to ergonomic panel and ordinary maintenance guide
- Low energy consumption as equipped with suitable material to keep warm water inside the tanks and fan energy start-stop
- Low water consumption through a consolidated system control to minimize in autonomy waste of water following setted parameters
- Maximum configurabilty for stand alone and inline solutions integration
- Versatility beyond limit always ensuring the high quality and drying results
- Increased productivity is guaranteed at high speed with any idle time



Automatic open top washer

VOT

Built with motorized adjustment of thickness up to 50 mm

All our range of products includes the over 10 advantages of Triulzi machines:

- Safety first as it is equipped with safety immaterial barriers and fences where required
- Top reliability even across 3 shifts
- Long Lasting as entirely made of stainless steel
- Reduced maintenance as well as an easier inspection through a motorized stroke up to 500 mm
- Low Noise Level below the standards
- Easy to use thanks to ergonomic panel and ordinary maintenance guide
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- Increased productivity is guaranteed at high speed with any idle time





Fire resistant glass proof line

FPS

Automatic system to handle, process and cleaning through aspiration device the outcoming inbetween special foam gel. Equipped with automated suction device to reach all 4 edges of finished fireproof panel.

Wet powdering unit for automotive application

WPS

For application of impalpable talcum powder on the shields surface before bending. Triulzi provides valuable know how and the expertise of engineers to establish the applicable operating conditions and performance to optimise integration with existing productions lines or create new ones, taking full advantage of automation and digitalisation in an industry 4.0 perspective. Our in house organisation and external chain selected according to strict reliability standards guarantee complete quality control, from the origin of material to components certification, assembly and final testing.



Automated line for the cleaning of architectural curved glass

SURF

Advanced innovation for symmetrical and asymmetrical curved glass process.

- High productivity in total safety. Industry 4.0
- Multiple glass loading
- User friendly touch screen to allow advanced management
- Interface with control systems of the work flow.
- Optional features on request
- Customized to meet specific processing needs of curvature

TUROMAS
OUR PASSION, YOUR PROGRESS

TUROMAS

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TUROMAS is a global reference in the manufacture of machinery for storing, loading and cutting glass, thanks to its continuous investment in R&D and its support to the customer during the whole purchase process. It is something that it has committed to since the first contact: trust to obtain a close relationship. No two factories are the same. For this reason, the Spanish company promises a tailor-made solution for every need, from semi-automatic equipment to fully automated cutting lines for all glass sizes.

FLOAT GLASS CUTTING



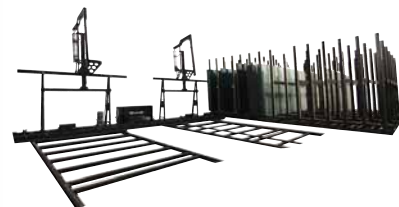
RUBI monolithic glass cutting tables are high-performance machines that offer exceptional cutting quality, meeting the requirements of low-emission glass manufacturers. There is a specific solution for each company, from independent and flexible cutting units to fully automated cutting lines.

LAMINATED GLASS CUTTING



LAM laminated glass cutting tables are autonomous machines that satisfy medium production needs or machines designed to be integrated into a mixed cutting line that responds to demand for maximum automation. Both types of machines are compatible with Low-E glass and guarantee a very high quality cut.

SMART STORAGE



TUROMAS smart storage systems can be ground-based, aerial or 'shuttle', for glass sheets of any size and thickness, supplying one or more cutting lines, depending on available space, current production needs and future projections.

SOFTWARE APPLICATIONS

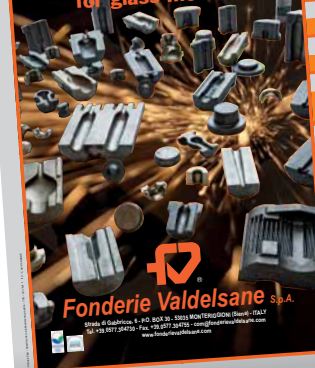
TUROMAS
Software

Designed for exponential productivity growth, reduced energy and human costs and improved cycle times.

- Complete automation of the line, including non-automated warehouses in the plant.
- Information available and updated in real time.
- Compatibility with the main software on the market.
- Generation of reports in spreadsheet format (MS-Excel)
- Preventive management of stocks, breakdowns and maintenance.

Glass Industry
Directory 2023

Special cast irons & alloys
for glass moulds



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Glass Industry
Directory 2023

The **GLASS INDUSTRY DIRECTORY** is a unique international annual guide which gives a complete overview of international glassworks and suppliers involved in hollowware and special glass manufacturing. About 300 pages of complete company profiles: addresses, management, sister companies, plants, number of employees, turnover, banks, year of company foundation, capital, trademarks, areas of activity, innovations, product-by-product and country-by-country breakdowns. The **GLASS INDUSTRY DIRECTORY** is the annual reference point for the international glass manufacturing industry comprising bottles and containers, domestic glassware, tubing, vials and ampoules, lighting glassware, technical and industrial glassware, scientific, laboratory and medical glassware and much more.



Review

October / December
2023

January
2024

PAGES 288 - 303



October 2023

PRESIDENT OF THE EC SUPPORTS AGC'S VOLTA FURNACE DESIGN PROJECT

AGC showed great pride when the President of the European Commission, Ursula von der Leyen, supported the company's VOLTA furnace design project, which was carried out jointly with Saint-Gobain. AGC was happy to see its efforts noticed by the EU institutions and that the European Commission stood ready to extend financial support.



Ursula von der Leyen also called electrification and decarbonisation projects like VOLTA "vital to make the European flat glass industry competitive, also in the clean economy of tomorrow."

Addressing the Green Deal Summit 2023 in Prague (Czech Republic) about the Clean Transition Dialogue with industries she mentioned glass production as an example. Not only as an example of "a national pride of Czechia" saying that "Europe cherishes these great national industrial treasures," but mentioned and praised AGC's VOLTA project as the glass industry investing in cleaner glass production. She also stated that the European Commission is "supporting the electrification of existing flat glass furnaces so that they can cut emissions by 75 percent."

ŞİŞECAM: SUMMARY OF NEW PRODUCTION CAPACITY INVESTMENTS

Şişecam released a summary of its investments on new production capacity.

- Construction of a EUR 255 million glass packaging greenfield project in Hungary with two furnaces with 330,000 tonnes of annual production capacity to be fully operational by 2025.
- Growth plans in Türkiye include:
 - a fifth furnace investment for glass packaging in the Eskisehir plant to increase capacity by 155k tonnes per year;
 - a new frosted glass furnace and energy glass processing plant in Mersin with a 400,000 tonnes annual production capacity, expected to reach full capacity by 2024-2025;
 - a new flat glass furnace in Türkiye with a 200,000 tonnes annual production capacity dedicated to auto glass production;
 - a new frosted glass furnace which will add 244,000

tonnes annual production capacity to the company's flat glass line.

The incremental capacity of over 1.3 million tonnes per year will be fully operational between 2023 and 2025. During 2023 the company also announced an investment in the mining field to ensure the raw material supply in its new flat glass and frosted glass investments in Mersin.



AGC: ELECTRO-BOOSTING INSTALLATION AT OSTERWEDDINGEN PLANT IN GERMANY

An interdisciplinary AGC team worked to install electro-boosting on various float glass production lines in an effort to partially electrify company production lines.

After Moustier in Belgium and Seingbouse in France, the installation of electro-boosting moved on to AGC's site in Osterweddingen, Germany. This was a major challenge for the team, as it required drilling operations in the floor (bottom refractories) of a hot furnace in operation, and doing so in very hot conditions. Thanks to efficient teamwork involving the team in Osterweddingen, Engineering, Purchasing, Sustainability, Technical Coordination, R&D and many supplier companies, the job was completed. AGC celebrated the successful installation of electro-boosting by their people on running float lines as a major achievement.



Electro-boosting is the direct use of electricity as a source of melting energy. It is one of the innovative breakthrough technologies, developed at AGC's Technovation Centre, that are essential to reducing direct emissions by 30 percent by 2030 and reach carbon neutrality by 2050. Direct emissions are the emissions caused when melting raw materials in the furnace with fossil fuels.

SAINT-GOBAIN: NEW RENEWABLE ELECTRICITY AGREEMENT IN NORTH AMERICA

Saint-Gobain signed a 15-year renewable electricity supply agreement (Power Purchase Agreement or PPA) with TotalEnergies for the purchase of solar power for its 125 industrial sites in North America (United States and Canada).

This 100 MW PPA, known as the Danish Fields Solar Project (Danish Fields), is expected to offset Saint-Gobain's North American CO₂ emissions from electricity (scope 2 emissions) by 90,000 metric tonnes per year. The project is expected to come online by the end of 2024.

Mark Rayfield, CEO of Saint-Gobain North America, said, "With this agreement, Saint-Gobain North America will further reduce its CO₂ emissions, demonstrating how fast the manufacturing industry can transform when long term solutions are at hand. This renewable energy project is a new milestone on the way to meeting Saint-Gobain's commitment to reduce scope 1 and 2 CO₂ emissions by 33 percent by 2030 – compared to 2017 – and to reach carbon neutrality by 2050."



Danish Fields, Texas, is the third PPA signed in North America by Saint-Gobain. The first PPA, with the Blooming Grove Wind Farm in Illinois, was signed in 2021, and the second, with Cottonwood Bayou Solar Project in Texas, was signed in 2022. The three projects combined are expected to represent a reduction of more than 70 percent in Saint-Gobain North America's scope 2 emissions, compared to 2017 levels.

DR KIRMAN, ŞİŞECAM CHAIRMAN, RECEIVES GLASS PERSON OF THE YEAR AWARD

Dr Ahmet Kirman, Şişecam Chairman and fully authorized executive member of the Board of Directors, received the "Glass Person of the Year 2023" award for his long-term, significant and valuable contributions to the global glass industry. This prestigious award, widely known as the "Oscars" of the glass industry, was presented by the Phoenix Award Committee at a special ceremony held in Como, Italy. Representatives of the global glass industry and the business world convened at this special event, where Phoenix Award Committee Chairman Lincoln Brown presented the award.



At the award ceremony, Dr Kirman delivered a speech on how the glass industry can play an active role in for solving the major challenges that the world is currently facing.

He also expressed his thoughts about the award: "It is a tremendous honour to be presented with this prestigious award. My professional journey has included roles as a judge, an academic and a banker, culminating in my experience in the glass industry. It is very impressive both in terms of motivation and responsibility to know that what we do is followed and appreciated in this sector. I would like to thank the distinguished members of the Committee."

Chairman Brown stated that they were very happy to

present this award to Dr Kirman, who had made significant contributions to the development of the glass industry for 17 years. He also pointed out that Şişecam was able to become a global powerhouse under Dr Kirman's inspiring leadership.

A global player in the global glass and chemicals industry, Şişecam conducts manufacturing operations in 14 countries on four continents with 24,000 employees and reaches 150 countries worldwide with its products.

TVITEC AND SIMEON: AN EXCEPTIONAL AND EFFICIENT PARTNERSHIP

Tvitec System Glass | CRICURSA and Gruppo Simeon collaborated on one of the most spectacular and sustainable projects in Europe, featuring extensive use of high-performance glass and wood.

This project, called Arbotretum, was developed in France. Additionally, the Simeon team became acquainted with the production capabilities of one of the world's leading brands



in curved glass for iconic projects, Cricursa.

Cricursa, following its alliance with Tvitec, has become increasingly involved in major projects involving curved glass, such as the Domino Sugar Refinery in New York, the Torres Colón in Madrid, and the new Palacio de la Música in Valencia.

Tvitec System Glass | CRICURSA and Gruppo Simeon continue to work seamlessly together, coordinating exciting new endeavours across Europe.

NSG GROUP LAUNCHES GLASS WITH 50% LESS EMBODIED CARBON

NSG Group pioneered a new glass range with 50 percent less embodied carbon when compared to standard float glass – representing the lowest carbon product of its kind on the market.

Pilkington Mirai™ is a low carbon alternative to regular float glass, with no difference in performance, quality or aesthetic appearance. Pilkington Mirai™ has been pioneered using a combination of alternative fuel, high recycled glass content and green electricity sources.

Kristian Chalmers, Global Strategic Commercial Manager at the NSG Group, said, "The launch of Pilkington Mirai™ represents the beginning of an exciting journey. The new range will be instrumental in providing architects with the solutions they need for reducing the carbon intensity of their projects.

"The market leading glass can be combined with other high-performance low emissivity, solar control and



acoustic coatings in the Pilkington product family – enabling building owners and design professionals to pro-actively reduce embodied carbon while meeting other building performance and compliance requirements.”



Panoramic windows in loft and concrete wall. 3d render

Leopoldo Castiella, Head of Architectural Glass Global at the NSG Group, said, “Pilkington Mirai™ is a sign of the glass industry’s continued progress towards decarbonisation for the benefit of the broader built environment. Cutting half of the embodied carbon of glass, without compromising on performance or aesthetical attributes, is a major technical feat born out of great collaboration.

“The new range presents a simple, more sustainable alternative that enables building designers to make immediate improvements on the carbon impact of their projects. Bringing forward solutions like this is central to the mission of NSG Group of changing our surroundings while improving our world.”

The company’s ambition is to work together to combat climate change, strive for social equality, and to protect the environment.

In 2022, the Science Based Targets initiative (SBTi) re-certified the NSG Group’s increased ambition to reduce its emissions by 30 percent by 2030 compared to 2018 levels.

The company further aims to achieve carbon neutrality by 2050 and continues to work pro-actively to make a positive impact on the environment through activities such as its world-first proof-of-concept trials of alternative fuels in glass making. This specific program led to the development of Pilkington Mirai™.

PROMAT SYSTEMGLAS LIGNA: FIRE PROTECTION FOR ROCHDALE TOWN HALL

Rochdale Town Hall is a nationally significant building, widely regarded as one of the UK’s finest examples of Victorian gothic architecture. Designed by William Crossland and opened in 1871, it is seen as a symbol of the town’s industrial standing in the textiles trade, and the local council wanted to make it fully open and available for the use and enjoyment of all residents and visitors.



Having fallen into a poor state of repair in recent years, urgent action was necessary to reverse and prevent even

further decline to the building. A two phase restoration and transformation project commenced in January 2021, with the Promat fire resistant glazing element being part of the second phase due for final completion late 2023. A large gothic window of the Grade One listed Rochdale Town Hall has been given a 21st century fire protection upgrade using Promat SYSTEMGLAS® as part of the multi-million GBP restoration project.

The window is a key feature of the newly created Bright Hall, a new community space on the second floor of the 19th century building designed to be used for smaller events such as weddings and functions, which were converted from offices.

Working in conjunction with fire safety consultants Jerry Quayle Associates, a design was agreed using the Promat SYSTEMGLAS® Ligna fire resistant glazing system to provide an EI60 integrity and insulation level of protection. Installed adjacent to the gothic window, this separate timber framed window perfectly matches the shape of the original pointed arch to minimise its visual impact. To ensure the window would provide assured protection, the SYSTEMGLAS® Ligna EI60 timber framing features PROMASEAL®-PL graphite-based intumescent seals, and the glass is an external grade product offering additional UV protection.

Promat UK and its approved installer Rated Solutions worked together closely to ensure the new window would match the gothic shape of the existing window, which involved multiple site visits to obtain accurate templates.

NSG PILKINGTON: NEW GLASS PROCESSING DIVISION MARKS COMPANY MILESTONE

A new glass processing division of Pilkington IGP, part of NSG Group, opened in Sandomierz, Poland, marking a company milestone.

As well as enabling NSG Group to respond to the growing demand for glass and insulating glass units at home and abroad, the expansion – marking the Company’s seventh branch in Sandomierz, – created new jobs in the area – boosting employment and helping the local economy. The opening took place on September 19, which officially marked the start of production with equipment that includes two production lines for double glazing, glass cutting tables, scissor lifts, manipulators, benders and overhead cranes.

The internal event was attended by employees and management representatives, including Krzysztof Granicki, Managing Director, AGE East, Nordic & Central Downstream and Christian Quenett, Head of Architectural Glass Europe.

In an opening speech, Operating Director Dariusz Kowalczyk said, “Our priority is to provide safe working condi-

tions in an atmosphere of mutual respect, inclusion and diversity, with a special focus on ethical issues while at the same time, remaining committed to values



such as quality and innovation. The opening of the new branch demonstrates the company's long-term commitment to the development of the industry."

Krzysztof Granicki, Managing Director, AGE East, Nordic & Central Downstream said, "This new plant is the company's response to the ever-growing demand for glass and glass products. It will increase our production capacity and satisfy the needs of our key customers in southern Poland.

"Currently, we have seven branches. The opening of this new one is not only evidence of the company's strong position, drive for innovation and quality, but also its forward-looking approach to development, which promises further achievements and successes."

VITRO EXPANDS CONTRACT TO PROVIDE GLASS FRONT SHEETS FOR SOLAR PANELS

Vitro S.A.B. de C.V. announced the expansion of its contract with the largest vertically integrated solar manufacturer in the Americas, First Solar, which was first announced in April of 2022. This expansion is intended to provide the glass front sheets used in advanced thin-film photovoltaic solar panels manufactured by First Solar.



Aligned with the Company's international expansion plans, this operation represents approximately USD 1.3 billion in sales over the next 10 years, in addition to the sales covered by the initial contract, estimated at a similar amount.

"We are very excited and grateful for the trust placed in us by First Solar, as it aligns with our goal of capitalizing on growth opportunities in the North American Trade Region based on our technological strength and collaboration with our customers. This agreement will allow us to participate in and develop the renewable energy sector in America," said Vitro CEO, Adrian Sada.

Considering the requirements of this expansion, Vitro will invest an estimated USD 180 million to upgrade one of the furnaces at the Meadville plant, in Pennsylvania, as well in adapting additional existing facilities, to support First Solar's growing manufacturing capacity in the United States.

"As we continue to grow our domestic manufacturing footprint, it is essential that our domestic value chain scales with us," said Mike Koralewski, chief supply chain officer at First Solar. "We are pleased to expand our contract with Vitro, which gives us access to a new source of American-made glass for the front sheets in our solar panels and supports our efforts to build resilience into our US supply chains."

"We take great pride in having earned this vote of confidence from First Solar. We are confident that our experience, technological capabilities, and innovative product development will contribute to their efforts to increase clean and renewable energy capacity in the United States and more broadly in North America," stated Ricardo Maiz, President of Vitro Architectural business unit.

Vitro's plants are strategically located to meet First Solar's needs and already have the required raw materials for production. Production is expected to commence in the first quarter of 2026.

PILKINGTON NA: LAURINBURG FLOAT 1 FURNACE LIT FOR THE SIXTH TIME

After months of preparation, construction and inspections, Pilkington North America's Laurinburg, North Carolina, Float 1 furnace was lit for the sixth time in October, 2023. Pilkington North America is part of the NSG Group.



Marking this occasion, 50-year veteran Calvin Hodges had the honour of lighting the furnace. The photo above features Mike Woodhead (Assistant Plant Manager), Calvin Hodges (Maintenance Technician) and Chris Markotich (Plant Manager).



The photo below was taken when Float 1 was lit for the first time in April of 1973. Since it was initially built in 1973, Float 1 has been through five repairs in its 50-year history.

AGC SUCCESSFULLY TESTS GLASS PRODUCTION USING HYDROGEN AS FUEL

AGC succeeded in a demonstration test of glass production using hydrogen as fuel. This marked the first time the AGC Group conducted tests using hydrogen in an actual production furnace. The test was conducted at the electronics float glass manufacturing facility of the Kan-



sai plant, Takasago factory, Hyogo Prefecture, Japan. The test was conducted with the support of Air Liquide Japan G.K. by implementing its hydrogen combustion burner to an existing conventional combustion process with oxygen using natural gas as fuel.



Glass melting furnace in which the demonstration test was conducted

| | | | | |
|--|---------------------|--|------------------|--|
| Combustion flames inside the glass melting furnace | Natural gas 100% | | Hydrogen 100% | |
|--|---------------------|--|------------------|--|

In this test, AGC verified the technological issues for utilizing hydrogen-fuelled oxygen combustion technology in glass production, including glass quality, effects on furnace materials, flame temperature (temperature of flame burning at burner installed in furnace), furnace temperature (temperature of gas inside the furnace and inner wall surface) and nitrogen oxide (NOx) emissions control. The NOx concentration in the emitted gas from this test was maintained at the same level as in 100 percent natural gas, while maintaining the required temperature of the glass melting furnace. Aiming for full-scale deployment, AGC will conduct scaled-up tests of the combustion capacity of the hydrogen combustion burner and consider demonstration tests at the AGC Group's global sites to determine the scope of application of hydrogen combustion technology.

The AGC Group conducts its glass production on a global basis and is developing various technologies so that it can use the most appropriate GHG emission reduction measures according to regional characteristics and timing.

The AGC Group will continue to promote sustainability management under its medium-term management plan AGC plus-2023, aiming to achieve its target of net-zero carbon emissions (Scope 1 and Scope 2) by 2050.



AGC Group's Technology Roadmap for Reducing GHG Emissions in Float Glass Melting

VITRO INAUGURATES NEW COATING OVEN, COATER 8, IN MEXICALI

Vitro inaugurated its new architectural glass coating oven, Coater 8, located at its Mexicali plant, Baja California, Mexico, the most sophisticated of its kind in North America. With an investment of approximately USD 60 million, Coater 8 added to Vitro's production capacity more than 6 million square metres of coated glass, characterized by coatings with nanotechnology, useful for controlling solar radiation and improving thermal insulation. These capabilities are increasingly in demand in the architectural and automotive industries, among others.

This increase in the production capacity of the Vitro Architectural Glass business unit resulted in a 20 percent increase in direct job creation at the Mexicali plant, which, in addition to providing greater opportunities for economic and professional development for the community, will help stimulate the economic activity in the region and the state of Baja California.



"This new investment in infrastructure propels Vitro toward its goal of continued growth and consolidation as one of the leading global glass manufacturers while reinforcing our commitment to combating climate change," said Adrián Sada Cueva, CEO of Vitro. "Vitro offers increasingly eco-efficient products that contribute to reducing greenhouse gases, helping minimize the demand for air conditioning and artificial lighting in buildings and the production of auto-mobiles with high-performance coatings for reduced fuel consumption."

Coater 8 includes the production of glass with Solarban™ nanotechnology coatings, which can reduce solar heat gain in homes and buildings by up to 75 percent, insulating the interior up to 6 times more effectively than standard glass. With this new oven, Vitro will be able to produce jumbo-sized layered glass (up to 3.30 by 6.10 metres), which is highly sought after in the regional market for constructing buildings that aim to control heat and preserve air conditioning more effectively, for vehicles with glass that enable improved fuel efficiency and comfort, and white goods that better insulate food and beverages, among other applications.

Representatives from all levels of government attended the inauguration event, including customers, executives, and members of Vitro's board of directors.

November 2023

GUARDIAN GLASS LAUNCHES SUNGUARD SNX 70+ COATED GLASS

Debuting at Glass-Build America, new SunGuard SNX 70+ coated glass helps meet the architectural community's desire for glass that combines high visible light transmission, a neutral aesthetic and strong thermal performance.



An artistic rendering intended to represent the reflected and transmitted colour of the glass in real use conditions. (Actual results may vary.)

The newest addition to Guardian Glass North America's commercial range of triple silver coated glass, SunGuard SNX 70+ has a visible light transmission of 68 percent and a solar heat gain coefficient of 0.28 on Guardian UltraClear™ low-iron glass. The resulting 2.45 light-to-solar gain ratio is the highest in Guardian's North American SunGuard portfolio. Paired with a 0.28 U-value, this glass can help buildings achieve their energy performance goals.

"SunGuard SNX 70+ was developed to help meet today's requirements for improved energy performance, while still achieving an aesthetic that is transparent and neutral," explained Alan Kinder, Director, Commercial Segment & Technical Services for Guardian Glass North America. "This triple-silver, low-E coating is designed to help deliver a consistent neutral reflected colour whether glass is viewed directly or at an angle."

By matching energy performance with a highly transparent aesthetic, SunGuard SNX 70+ transmits light and colour true to life, so that views become vivid, interiors and exteriors connected – all while providing valuable thermal and solar performance.

Designed to be used on the #2 surface of a standard insulating glass unit, SunGuard SNX 70+ can be paired with a variety of substrates at the following thicknesses to help deliver the attractive exteriors and bright, comfortable interiors architects seek:

- 6, 8, 10 and 12 millimetres – Clear and Guardian UltraClear low-iron glass
 - 6, 8 and 10 millimetres – Guardian CrystalGray™ glass
- The product requires heat treatment and can be produced on jumbo (130 by 204 inch) and super jumbo lites (130 by 240 inch) at 6 to 12 millimetre thicknesses (clear or Guardian UltraClear low-iron glass).

Guardian SunGuard SNX 70+ is available through the Guardian Select™ Fabricator network.

SOLAR FACILITY PROVIDES AGC GLASS HUNGARY WITH RENEWABLE ENERGY

E.ON Hungária Group set up a 4 MWp (megawatt peak) solar farm on the premises of AGC Glass Hungary, a subsidiary of AGC Automotive Europe located in Hungary, ensuring a long-term supply of green energy and significantly contributing to the Company's carbon neutrality goals.



The solar farm operated by E.ON provides AGC Glass Hungary with a source of renewable energy

This solar farm is located in the Tatabánya-Környe Industrial Park, adjacent to AGC's Környe-based Hungarian facility. E.ON's team of experts installed 8,802 solar panels across 5 hectares of available land, enabling AGC's solar farm to generate 4.8 GWh (gigawatt hours) of electricity annually, equivalent to the energy consumption of around 1,900 households. The solar energy collected by 34 inverters, each with a capacity of 100 kW, is converted from direct current (DC) to alternating current (AC). The AC power is then channelled through two on-site transformer stations to provide the glass manufacturing plant with green energy.

The solar farm at AGC's Hungarian site is the product of a long-term power purchase agreement (PPA) with E.ON. This innovative project allowed E.ON to supply AGC with electricity at a predetermined price, shielded from market fluctuations. This contract between AGC Glass Hungary Kft and E.ON Hungária Group represented Hungary's first PPA for solar power, in which an energy company installs a solar farm at the customer's site, ensuring a reliable and enduring source of renewable electricity.

Thanks to this partnership, AGC's Hungarian facility will reduce its CO2 emissions by 116 to 220 grams per kilowatt-hour through the generation of renewable electricity. AGC incurred no initial expenses for the solar farm, as it is fully funded and operated by E.ON, with remote monitoring of renewable electricity generation handled by E.ON through its operations management centre.

The partnership between E.ON SE, based in Essen, Germany, and AGC Glass Europe, headquartered in Belgium, was established in 2019. Since then, these two major European companies have successfully executed various joint energy efficiency projects across Europe, including one in Seingbouse, France, and multiple sites in the Czech Republic. E.ON and AGC plan to continue their long-term partnership and expand their portfolio of photovoltaic power plants throughout Europe in the future.



NSG GROUP: PRODUCTION LINE OF SOLAR GLASS STARTS OPERATION IN MALAYSIA

NSG Group announced the warm up of a newly converted TCO (transparent conductive oxide) facility in Malaysia. In this investment, an existing float line at the Johor Bahru factory of Malaysian Sheet Glass SDN BHD, a member of NSG Group, was converted to produce TCO glass from December 2023. The investment is to support the expansion strategy of First Solar, Inc., a leading American solar technology company and global provider of responsibly produced eco-efficient solar modules, which has a long-standing strategic partnership with NSG Group. The float line will supply glass to First Solar's Southeast Asia manufacturing footprint.



In order to meet the growing global demand for solar panels manufactured by First Solar, NSG Group started operation of the second dedicated float line for solar glass in Vietnam in January 2020, and a new plant in Luckey, Ohio, USA has been operating since November 2020. The glass produced in these plants is exclusively supplied to First Solar.

The Group is also considering expanding further capacity for solar energy glass in USA, to ensure it meets solar glass demand by First Solar. NSG Group is promoting "Expansion of Value-added Business" as one of the measures listed in the medium-term management plan "Revival Plan 24." (RP24) The expansion of solar glass based on NSG's proprietary online coating technology is part of this strategy and also of their aim to contribute to solve global environmental issues, including promoting the shift of renewable energy. The Group will continue its efforts to realize its Medium-Term Vision to be "A global glass supplier contributing to the world with high value-added glass products and services."

The Group is also considering expanding further capacity for solar energy glass in USA, to ensure it meets solar glass demand by First Solar.

NSG Group is promoting "Expansion of Value-added Business" as one of the measures listed in the medium-term management plan "Revival Plan 24." (RP24) The expansion of solar glass based on NSG's proprietary online coating technology is part of this strategy and also of their aim to contribute to solve global environmental issues, including promoting the shift of renewable energy. The Group will continue its efforts to realize its Medium-Term Vision to be "A global glass supplier contributing to the world with high value-added glass products and services."

RIOU GLASS ACQUIRES VIDRESIF

RIOU Glass decided to acquire Vidresif, a Spanish glazing manufacturer, as part of its development strategy. For RIOU Glass this is the first complete acquisition outside France.

In the last 18 months RIOU Glass has acquired a stake in the Italian glassmaker Cappelletti & Roleri and in the Belgian group Euro-



glas and all the shares of the Loire-based company Difuver.

Established in 1979 by Pierre and Christiane Riou, RIOU Glass is an independent French family group which employs almost a thousand employees across 16 processing sites in France, as well as a float glass plant, Eurofloat in Salaise-sur-Sanne.

AGC: SUCCESSFUL DEMONSTRATION TEST OF SOLAR PANEL COVER GLASS RECYCLING

AGC succeeded for the first time in Japan in a test to recycle about 24 tonnes of used solar panel cover glass into raw material cullet (pieces of broken glass). The test was conducted from October 19 to 22, 2023 at the AGC Yokohama Technical Centre's figured glass production furnace.



For the recovery of glass from solar panels, the test used the heat treatment technology of the commercial solar panel recycling production line of Mitsubishi Chemical Group company Shinryo Corporation.

The service life of solar panels is estimated to be 20 to 30 years, and panels weighing hundreds of thousands of tonnes are expected to be disposed of annually starting in the late 2030s. Cover glass accounts for about 60 percent of this total weight, and there are concerns that a serious environmental impact will occur if disposed of as industrial waste in large quantities in landfills.

In this test, it was confirmed that solar panel cover glass can be turned into raw material cullet that can be reused for flat glass production through a special heat treatment. This will reduce industrial waste and conserve raw materials derived from natural resources such as silica sand and soda ash, thereby contributing to the promotion of the circular economy. Furthermore, the promotion of raw material cullet utilization will lead to GHG emission reductions in the manufacturing process.

VITRO TO TEMPORARILY IDLE PRODUCTION LINE IN CARLISLE, USA

Vitro Architectural Glass decided to temporarily idle one of the raw-glass production lines of their plant in Carlisle, Pennsylvania, USA. The shut-down was needed to reconfigure production line 1 to manufacture solar panel glass

for First Solar. Work will start in the first quarter of 2024 and affect approximately 90 positions.

In October, Vitro received a second contract with First Solar that the company says is expected to generate additional sales of USD 1.3 billion. The company expects to invest approximately USD 180 million to update the Meadville and Carlisle facilities for First Solar production.



“We thoroughly analysed our current operations and assessed future production demands to ensure that we can continue to reliably serve our current customers, while also accommodating this new business with First Solar,” said Ricardo Maiz, President of Vitro Architectural Glass. According to Maiz, the line is “the most strategic line for Vitro to reconfigure for solar glass production” and it should be back online during the second half of 2025 at the latest. Line 2 will continue to manufacture products for commercial and residential glass customers.

“We are extremely excited about the future and how this re-alignment positions us for the upcoming years,” said Maiz. “It’s never an easy decision to idle production, even on a temporary basis, but Vitro is committed to manage its business with a long-term view and continue to be the best supplier we can be for our core customers.”

The Carlisle facility is one of five Vitro plants in the United States.

AGC GLASS EUROPE: FINEO VACUUM GLAZING IS “PRODUCT OF THE YEAR 2023”

AGC Glass Europe’s Fineo vacuum glazing was awarded “Product of the Year 2023” by the Society of Façade Engineering (SFE).



FINEO is the new generation of insulating glazing, representing ideal thermal insulation and comfort, better noise protection, more natural light and sustainability. Thanks to its vacuum glazing technology FINEO glass is ultra-thin and light. Therefore, it allows easy and quick installation. After years of development, Fineo was introduced to the market in 2019 by AGC Glass Europe. With more than 100 years of experience in the glass industry AGC Glass Europe has been developing insulating glass for 60 years. The company develops its products with the most innovative techniques to minimise the environmental impact. 50 percent of the budget for research and development goes towards creating and developing sustainable products, solutions and production.

December 2023

ŞİŞECAM CELEBRATES 88TH ANNIVERSARY

Şişecam celebrated its 88th anniversary in 2023. Inspired by the visionary leadership of Mustafa Kemal Atatürk,



who founded the company, Şişecam started its growth journey with a single facility in Turkey and 400 employees in 1935. As of 2023, Şişecam is a global pioneer that operates production facilities in 14 countries with a sales network of 150 countries and more than 25,000 employees.

As the only global company operating in all core areas of glass, Şişecam’s digital capabilities, expertise, technological competence and highly competitive operations make it one of the world’s leading manufacturers. Şişecam ranks among the world’s top two manufacturers of glassware and the top five producers of glass packaging and flat glass. Şişecam is one of the two largest soda producers in the world and the world leader in chromium chemicals.

Şişecam is in a comprehensive transformation process to move its 88 years of experience forward into the future. The company considers transformation as one of the main elements of its progress and is dedicated to differentiating itself with the use of smart technologies and competent human resources.

Şişecam continues its efforts with a net zero carbon vision for 2050 while keeping sustainability at the heart of its operations. Its 2030 CareforNext sustainability strategy has provided Şişecam with significant momentum during its sustainable growth journey. The company closely monitors developments in science and technology, as it moves forward by focusing on “Protect the Planet,” “Empower Societies” and “Transform Lives” pillars of CareforNext.

EVOLUTION OF SAINT-GOBAIN’S GOVERNANCE

As a natural conclusion of the transition period that began in 2021, and in order to ensure the governance structure best suited to its ambi-



tions as well as to the challenges and opportunities it faces, Saint-Gobain’s Board of Directors unanimously took the following decisions:



- The functions of Chairman and Chief Executive Officer will be combined, and Benoit Bazin, Chief Executive Officer since 2021, is appointed Chairman and Chief Executive Officer effective from the close of the General Shareholders' Meeting to be held on June 6, 2024;
- Jean-Francois Cirelli, Independent Director since 2020, will be appointed Lead Independent Director and Vice-Chairman of the Board from the close of said meeting;
- The Lead Independent Director's powers will be enhanced, and the by-laws will provide that the Board must appoint a Lead Independent Director and Vice-Chairman of the Board in case of combination of the functions of Chairman and Chief Executive Officer or if the Chairman is not independent;
- The proportion of Independent Directors will increase to 82 percent with the three new Independent Directors who will be proposed at the General Shareholders' Meeting: Sophie Brochu, former CEO of Hydro-Québec, Hélène de Tissot, CFO of Pernod Ricard, and Geoffroy Roux de Bézieux, entrepreneur.

As announced when his mandate was renewed in 2022, Pierre-André de Chalendar will retire as Chairman at the close of the General Shareholders' Meeting on June 6, 2024. He has also informed the Board of his decision to resign from the Board at that time.

In this context, the Board of Directors has been working in depth since 2021 to enhance the effectiveness of the Group's governance and the independence of the Board, by restructuring the balance of power within it. The Board considers that combining the functions of Chairman and Chief Executive Officer after the transition period is the best solution for the Group. In addition, to enhance the balance and solidity of the Board, it has decided to propose to the General Shareholders' Meeting that the obligation to appoint a Lead Independent Director with reinforced powers be provided in the Company's by-laws. Lastly, subject to a positive vote by the General Shareholders' Meeting on the Board's proposals, the proportion of Independent Directors on the Board will increase from 73 percent to 82 percent.

NSG GROUP ANNOUNCES NEW SOLAR GLASS PRODUCTION LINE IN THE USA

NSG Group announced a plan to invest in additional TCO (transparent conductive oxide) glass production capacity in the United States, to support the growing solar market. In the plan, a float line at the Pilkington North America, Inc. Rossford, Ohio location, a member of NSG Group, will install online coating capacity and will start shipping TCO glass for solar panel manufacture in the first quarter of calendar year 2025.

The upgraded float line in Rossford, Ohio will support

the expansion strategy of First Solar, Inc., the largest solar manufacturer in the U.S. and a global provider of responsibly produced



eco-efficient solar modules, which has a long-standing strategic partnership with NSG Group. The float line will supply glass to First Solar's manufacturing footprint in the U.S., which is forecast to grow to 14 gigawatts of annual nameplate capacity by 2026.

To meet the growing global demand for solar panels, specifically First Solar, NSG Group started operation of the second dedicated float line for solar glass in Vietnam in January 2020, and a new plant in Luckey, Ohio, USA, has been operating since November 2020. The conversion of another NSG group float line in Johor Bahru was completed and has begun production. The glass produced in these plants is exclusively supplied to First Solar and will bring the total of lines dedicated to First Solar production to five. NSG Group continues to consider expanding capacity for solar energy glass to ensure it meets First Solar demand.

SAINT-GOBAIN GLASS LAUNCHES A GAME-CHANGER SHATTERPROOF MIRROR

When a mirror breaks, shards of glass can be dangerous for everyone, both for building occupants and for the professionals who handle and install it. That is why Saint-Gobain Glass developed a new patented solution – MIRALITE® EASYSAFE, which retains 98 percent of splinters in the event of a breakage.



As a highly versatile mirror, it is designed for homes, where safety is a priority (bathrooms, decorative mirrors, wardrobes, sliding doors...) as well as for high-traffic buildings such as retail (fitting rooms), sports facilities, hotels, etc.



Co-developed with Saint-Gobain Glass clients, MIRALITE® EASYSAFE also meets the needs of processors since it is almost as easy to process as a simple mirror and much easier than a traditional safety-backed filmed mirror.

Finally, this technology reduces plastic waste but also the raw materials used in its manufacturing are lead and solvent-free, making it a more sustainable alternative compared to the actual solution.

A similar solution has also been on offer since 2023 in India, MIRASAFE™.

NSG GROUP: NEW MURAL IN SANDOMIERZ WILL CLEAN THE AIR

An eco-friendly mural in Sandomierz, Poland, highlighted another NSG Group initiative for the environment. The company provides solutions in the form of products



that fit into the philosophy of sustainable development in various ways. One of them is Pilkington Activ™ self-cleaning glass, thanks to which there is no need for frequent window washing, thus saving water, and reducing waste water. Another is Pilkington AviSafe™ bird safe glass, which has a special coating that is visible to birds, so they don't bump into the glass during flight.



The new mural was made of special photocatalytic façade paints, which have the ability to reduce urban and industrial pollution from the air and have anti-smog properties. This unusual project was created under the supervision of the city's conservation officer as a result of NSG Group's cooperation with the Sandomierz City Hall and the Sandomierz Municipal and Housing Enterprise. The realization was entrusted to Wrocław-based Donut Studio, which specializes in painting environmental murals. The new mural is 16 metres high, 5 metres wide, and covers a total area of 80 square metres. The size plays to the advantage of Sandomierz residents, as the larger the surface is covered with photocatalytic paints, the more pollution is neutralized. On the other hand, the large surface provides the mural with high readability of the repositioned image. It refers to the legend of Salve Regina, which says that after the Tartars slaughtered 49 Sandomierz Dominicans, a mighty bull broke out of the monastery barn and set off in pursuit of the invaders. When he could not catch up with them, he made a mound with his hooves, on which he carved an inscription with his horns: "Salve Regina."

NSG Group is striving to achieve carbon neutrality by 2050 and is actively working to make a positive impact on the environment through activities such as the world's first tests of alternative fuels in glass production.

This program has led to the development of Pilkington Mirai™ low carbon glass. It is a low carbon footprint alternative to regular float glass, with the same performance, quality and aesthetics. The new glass is produced using a combination of alternative biofuel, high recycled glass content (as much as 50 percent) and green electricity sources. (100 percent of the electricity used to produce the glass comes from renewable sources.)

GLASS FOR EUROPE POLICY MANIFESTO FOR EUROPE 2024-2029

Executives from Glass for Europe member companies introduced the challenges and opportunities faced by Europe's flat glass sector and presented concrete policy priorities for the next mandate. In a series of five videos released to mark the launch of the flat glass industry policy manifesto for Europe for the next five years 2024 - 2029.

In June 2024, European citizens will go to the polls to elect new Members of the European Parliament. This event is the first of a series of institutional changes - new European Commission, new President of the European Council, etc. - which will mark the start of a new five-year mandate for the European Institutions.

The next five years will be crucial for the European Union as Member States will implement the many pieces of Green Deal legislations and EU institutions will gear up to achieve the 55 percent CO₂ reduction target set by 2030. At the same time, Europe will most likely remain

confronted with recurrent extreme and adverse climatic conditions, a challenging energy landscape and growing competition from outside, which puts pressure on Europe's industry and economy.



In this context, Glass for Europe has decided to go public with a policy manifesto for Europe, entitled 'A mandate to focus on enabling sustainable transformation.'

With interventions from both flat glass manufacturers' executives and members of the Glass for Europe secretariat, these videos present the vision of the flat glass sector, explain today's industrial realities, and make concrete policy recommendations.

The aim is to reach out to policy makers, who desire to hear from the industry leaders how targeted policy choices can make a difference and enable further sustainable transformation in a sector, like flat glass and glazing. This aims to initiate further policy dialogue, along the lines of the participation of Glass for Europe Chairperson, Joana Arreguy from Saint-Gobain, to the Clean transition Dialogue organised on November 30 by EC President Von der Leyen and Vice-President Sefcovic.

VITRUM GLASS GROUP: GLASS FABRICATION AND COATINGS WITH ENDUROSHIELD

For over 25 years Vitrum Glass Group has served North American customers. According to Tara Brummet, Chief of Staff at Vitrum Glass Group, the company prides itself on being the fabricator of choice by meeting the de-



manding needs of key partners throughout the US and Canada.

Vitrum offers a wide range of glass products including insulated glass units, heat-treated, spandrel, digitally printed and laminated glass for a variety of applications such as store front entrances, curtain walls, railings, interior partitions and shower enclosures.



With EnduroShield's cutting-edge coating solutions, Vitrum's customers enjoy a range of benefits including extra revenue source, enhanced stain resistance and even protection from concrete slurry and cement dust.

"EnduroShield has allowed Vitrum to provide end users with the opportunity to generate sales while investing in a long-lasting, sustainable and efficient solution for their glass protection needs," said Brummet.

Moreover, EnduroShield delivers enduring benefits beyond construction. The coating shields glass from building run-offs, staining and corrosion, while requiring minimal maintenance and offering effortless cleaning for years to come.

EnduroShield can also contribute points to LEED projects through improved water efficiency from reduced cleaning time and frequency. The long lasting, easy clean surface also negates the need for harsh chemicals, leading to a reduction in on-site chemical usage and run-off.

"We are committed to delivering only the highest quality products and services to our clients, and our partnership with EnduroShield is no exception," said Brummet. "Together, we are looking forward to innovating and expanding the possibilities of glass surface protection in various applications and contributing to a more sustainable future."

PRESS GLASS SUPPLIED GLASS FOR THE WAVE, UNIVERSITY OF SHEFFIELD

Centrally located on the campus of the University of Sheffield, UK, The Wave is an ultra-modern building designed for the Faculty of Social Sciences.



This world-class facility provides a unique, sustainable work environment stimulating research and study development.

The entire project accomplishment involved multi-stage technical consultations and searching for innovative solutions. Working with façade contractor Charles Henshaw & Sons Ltd., Press Glass supplied more than 5,000 square

metres of façade glass. Among others, laminated glass with Digital Print technology, acoustic glass units and glass with SunGuard coatings for increased solar control and thermal insulation were used for façade glazing.

The production of façade glazed units with heights in excess of 3,800 millimetres and a complex design was an additional challenge for the Press Glass engineering team.

The nearly 17,000 square metre building was designed by HLM Architects in close collaboration with the University of Sheffield authorities. The Wave has been strategically located between two parks, offering comfortable and safe meeting spaces for students, staff and the local community. The design of the building comprised both the dynamic scientific development of the university as well as fulfilled the mission of sustainable architecture by obtaining the prestigious BREEAM Outstanding certificate. The façade of The Wave was designed with care to control internal conditions while presenting a striking, rhythmic design that "flows between transparency and solidity." The visible slender rounded corners add lightness to the block and the large-format façade glass ensures thermal and acoustic comfort.

The building was commissioned in April 2023. In July 2023, the architectural design of The Wave won the prestigious South Yorkshire Property Award in the design excellence category.

RYZE HYDROGEN TO PROVIDE HYDROGEN TO GUARDIAN GLASS

Ryze Hydrogen will support the Guardian Glass UK float glass plant in Goole, East Yorkshire, with hydrogen, used as a technical gas in the manufacturing of



float glass, the most widely produced form of glass used in car and building windows, as well as mirrors.

In 2023, Ryze became a member in Glass Futures to explore the role of hydrogen can play in reducing the glass industry's carbon emissions.

Jake Harding, Business Development Executive at Ryze, said, "Float gas is a key component for the construction and automotive industries which are, in turn, key pillars of the UK economy."

Guardian Glass' Plant Manager, Chris Duguid, added, "Hydrogen is vital to our float gas production processes. Hydrogen is used to create an oxygen-free environment as a blanket to avoid oxidation of the tin onto which we float molten glass. As this is needed 24-hours a day, it is absolutely critical that we partner with a reliable supplier, which is what we have with Ryze."

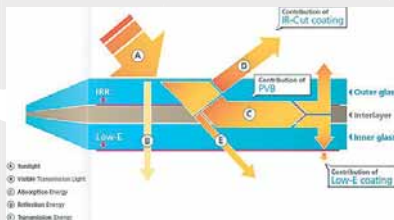
AGC'S THERMAL COMFORT PANORAMIC ROOF ADOPTED ON THE MARKET

AGC developed a thermal comfort laminated glass roof covered with low-E coating (low emissivity glass: glass covered with a special coating that reduces heat transfer by radiation) combined with IR-coating (Infra-red cut glass: glass covered with a special metallic coating that reduces cabin heating from the sun), which was adopted for the new Toyota C-HR launched in 2023.



AGC's thermal comfort panoramic roof offers the biggest possible transparent opening to increase light in the cabin while keeping unique thermal comfort performances.

The combination of the laminated technology covered with IR-cut and low-E coatings enables reflection of infra-red rays in summer while



keeping heat inside the cabin in winter. As a result, the sunshade can be eliminated, which contributes to a safe and comfortable drive with more head-room while offering a large view of the sky.

This unique panoramic roof contributes to sustainable mobility as it enables reduction in the use of heating and air-conditioning in summer and winter thanks to the thermal comfort coatings, and it offers a lighter body thanks to the sunshade removal.

The AGC Group has positioned the mobility business as a strategic business. AGC will contribute to the realization of a sustainable mobility society by providing optimal materials and solutions, as the functions required by automotive glass diversify with the advancement of CASE.

POLFLAM GAIA: WORLD'S FIRST LOW-CARBON FIRE-RESISTANT GLASS

Inspired by the timeless essence of a Greek goddess, POLFLAM revolutionary product symbolizes the nurturing spirit of Mother Earth and is a ground breaking solution dedicated to preserving the planet.



POLFLAM GAIA low-carbon fire-resistant is recognisable by the LOW CO₂ product marking

Pioneering a new era, POLFLAM GAIA is the world's first low-carbon fire-resistant glass, thoughtfully crafted through the fusion of hydrogel technology from the

POLFLAM factory and the distinctive attributes of Pilkington Mirai™ low-carbon float glass. Employing environmentally conscious methods, such as the use of alternative fuels, renewable energy and raw material recycling, this glass ensures a significantly reduced carbon footprint. By using eco-friendly material and advanced production techniques, POLFLAM has successfully cut CO₂ emissions during manufacturing process by up to 65 percent compared to standard fire-resistant glass.



The first pane of POLFLAM fire-resistant low-carbon glass – Left to right: Dawid Kuczowski, Logistics and Purchasing Director; Roman Abrahams, Commercial Director; Marek Przywózki, Process and Engineering Manager

POLFLAM GAIA with its reduced carbon footprint can achieve superior results in Green Building Labels environmental certification, aligning seamlessly with LEED, BREEAM and DGNB standards. This product makes it easy to reach the highest standards of eco-friendly construction. With fire resistance ranging from EI15 to EI180, this glass isn't just an eco-friendly innovation; it's a partner in creating a sustainable and vibrant living space. Independently evaluated by a third-party institute conducting a comprehensive Life Cycle Assessment (LCA) and an Environmental Product Declaration (EPD), the new EPD is set to confirm POLFLAM GAIA as the fire-resistant glass with the lowest carbon footprint on the market by the end of the first quarter of 2024.



POLFLAM GAIA

PILKINGTON UK: EUROPE'S 1ST CARBON CAPTURE TRIAL IN FLAT GLASS INDUSTRY

Pilkington United Kingdom Limited, part of the NSG Group, successfully launched Europe's first carbon capture trial in the flat glass industry alongside partners C-Capture and Glass Futures.

On December 12, the project partners met at the Pilkington UK's glass manufacturing site in St Helens, UK, to see the carbon capture unit in action. The unit captures carbon from the float furnaces flue which, in the future, could then be stored or further utilised.

The trial forms part of C-Capture's national project, "XLR8 CCS – Accelerating the Deployment of a Low-Cost Carbon Capture Solution for Hard to Abate Industries." The project aims to demonstrate that a low-cost carbon capture solution is a reality for difficult-to-decarbonise industries in the race to net zero.

Beginning with glass production, XLR8 CCS will prove the ability of C-Capture's innovative carbon capture



technology to remove carbon dioxide from the flue gas emissions of three industries which are difficult to decarbonise but committed to reducing their carbon levels.

The compatibility of C-Capture's proprietary solvent-based technology will be assessed with a further five carbon capture trials from next year at sites owned by project partners Glass Futures, Heidelberg Materials and Energy Works Hull – in conjunction with leading consulting and engineering company, Wood. Carbon capture solvent compatibility units (CCSCUs) designed and built by C-Capture and Wood will be installed and operated on partners' sites.

Project success will see C-Capture and its project partners well placed for deployment of commercial-scale carbon capture facilities across the three industries by 2030 which could capture millions of tonnes of CO₂ per year.



C-Capture's Project Manager, Claudia Hernandez, and XLR8 CCS project partners at the CCSCU which has been deployed at Pilkington UK's site in St Helens, UK, to trial C-Capture's carbon capture technology in the glass manufacturing industry

SCHOTT INVESTS IN THE LANDSHUT SITE

Technology group SCHOTT is adding a state-of-the-art new building to its existing plant in Western Landshut, Germany, which extends SCHOTT's 80-year presence in the Lower Bavarian district capital. The expansion not only aligns with the company's continuous growth strategy, which is geared towards driving innovation, but also with its commitment to environmental stewardship. The facility will be 100 percent climate-neutral and meet all its electricity needs using renewable energy sources

With the Landshut construction project, SCHOTT is making itself fit for the future and investing a substantial double-digit million-EUR sum. After completion, which is planned for fall 2025, the current plant in the city centre will relocate to the new site and begin consolidating into a large competence centre in Landshut.



The ground-breaking ceremony in the presence of numerous guests of honour marks the start of construction work on the new state-of-the-art SCHOTT building - Photo: SCHOTT



The new, ultra-modern administration and production building (right) will complement the SCHOTT site in Landshut
Photo: SCHOTT

During the official ground-breaking ceremony on December 5, 2023, Peter Kniprath, Head of SCHOTT Business Unit Electronic Packaging, welcomed Landshut's Lord Mayor Alexander Putz, Lower Bavaria's District President Rainer Haselbeck and others to celebrate the start of a new era together.

"As the centre of our site, the new building will enable us to strengthen Landshut as one of the most important innovation and development locations of the SCHOTT Group," said Kniprath.

Site manager Thomas Gassner added, "By optimizing the structures and creating state-of-the-art production facilities, we will be able to further improve our international competitiveness and create a modern and future-oriented environment for our employees."

As a leading international technology group, SCHOTT develops and produces specialty glasses and high-tech components for a wide range of markets and applications. For many years, the Landshut site has acted as an innovation centre and partner for global customers from a wide range of growth industries including data and telecommunications, e-mobility, consumer electronics, medical and dental technology, energy, sensor technology and the aerospace industry.

January 2024

GUARDIAN GLASS INTRODUCES GUARDIAN NEXA™ TO EUROPE

Following successful pilot production runs, Guardian Glass has introduced a lower-carbon float glass to the European market. The new Guardian Nexa™ can also be used as a base or laminated glass for Guardian high performance products, including the Guardian SunGuard™ and Guardian ClimaGuard™ ranges of coated glass products.

Guardian Nexa glass, developed through research and development, technical innovation and manufacturing expertise, can be used in a wide range of building façade applications and can help to reduce the embodied carbon of the built environment. When compared to Guardian Glass' standard float glass production, the benefits of Guardian Nexa glass include:

- Reduced embodied carbon by more than 30 percent to approximately 7.0 kg CO₂e/m² for 4 millimetre float glass
- Higher cullet content – from both internal and external sources
- No compromise on performance and aesthetics, similar to Guardian ExtraClear™ float glass

Guardian Glass strives to improve both the environmental performance and effectiveness of their manufacturing

processes and products, while consuming fewer resources. This involves considering each stage of the process, including the



sourcing of raw materials and the efficiency of furnaces. Guus Boekhoudt, Guardian Glass Executive Vice President, said, "This is a significant accomplishment by our R&D and operations teams, achieved through a combination of ongoing innovation in manufacturing processes and the optimization of cullet use. It reflects our dedication to our Environmental Stewardship priorities, including improving energy efficiency and air emissions, and managing resources responsibly."

Detailed environmental data on Guardian Nexa will be documented through an Environmental Product Declaration (EPD). This is currently under development and is expected to be available in Q2 2024. Since 2021, the scope of the EPDs for Guardian Glass products in Europe has been widened to consider CO₂ emissions generated from production processes, increasing the level of transparency provided to customers.

NSG PILKINGTON: TEN TOP TIPS FOR CHOOSING SECURITY GLASS

Reducing the risk of accidents and protecting against a deliberate attack is a vital task installers must undertake when specifying glass. From security to fire resistance, glass can be used to protect a building's occupants while also allowing the creation of bold and attractive designs.



NSG Pilkington offered some helpful pointers to consider when specifying security glazing as part of an insulating glass unit (IGU).

1. **Double up.** Security glass commonly comprises two panes of glass laminated together with a PVB interlayer between them. If this should break, the fragments are held together by the interlayer, reducing the risk of injuries occurring from smashed glass.
2. **Know the rules.** It is important to know the applicable national regulations related to security glazing and comply with them not only for newly constructed buildings, but also for those undergoing renovation.
3. **Keeping up standards.** Resistance to manual attacks and burglaries is tested to EN 356. The minimum classification is P1A, which can typically be achieved with 6.8 millimetre Pilkington Optilam™ laminated

glass.

4. **Stay safe.** Public safety is vital when choosing glass. The highest impact safety performance achievable by laminated glass is 1(B)1, which means it has been designed to either not break or break safely when subjected to accidental human impact.
5. **Seeing double.** For double-glazing units, specify an outer pane of toughened glass for safety and strength, with an inner pane of laminated glass for safety and security. Safety glass is designed to reduce the risk of accident by impact, whereas security glass is for withstanding intentional attacks.
6. **Withstand attacks.** Glass can be designed to withstand various forms of attack, such as explosions and gunfire.
7. **Keep quiet.** Noise control can be enhanced without compromising on security by switching to acoustic laminated glass.
8. **Frame it.** Frame construction and glazing methods are critical for security glass. It is important that windows and doors have been tested to a recognised standard.
9. **Spoilt for choice.** As well as safety, security and noise control, laminated glass can also be supplied with additional functionality such as thermal insulation, solar control and UV protection.
10. **Check the loadings.** You may have selected a security glass, but don't forget that it will still need to resist wind and barrier loads.

ŞİŞECAM FINALIZES ITS PARTNERSHIP AGREEMENT WITH ICRON

Şişecam Investment B.V., a wholly-owned subsidiary of Şişecam, purchased shares in the Turkish technology company ICRON at the closing general meeting held on January 15, 2024.



Şişecam Investment B.V. General Meeting was attended by Şişecam Chairman and Executive Member of the Board Dr Ahmet Kirman, Şişecam CEO Görkem Elverici, ICRON Founding Partner A. Tamer Ünal, ICRON Chairman and CEO Gürer Ünal and ICRON Board Member Ahmet Ertuğrul.

Some 3 percent of ICRON's total shares were purchased by Şişecam Investment B.V. for USD 3 million. Simultaneously with the share purchase, it was also decided to increase ICRON's total capital by USD 5 million, with participation solely by Şişecam Investment B.V. As a result of this capital increase, Şişecam Investment B.V.'s stake in ICRON will rise to 15.66 percent.



In the first half of 2023, Şişecam signed a letter of intent to invest in ICRON, a provider of operational and strategic decision optimization services to various industries. In October 2023, Şişecam announced that it had reached a partnership agreement with ICRON. Under the agreement approved by the Turkish Competition Authority, Şişecam also holds an option to purchase additional shares in ICRON – allowing it to raise its total stake in the company up to 49 percent – in the future. Şişecam’s goal with this partnership, its first investment in software technologies, is to grow in tandem with ICRON, a high potential technology services provider. In addition, Şişecam aims to take its operational excellence and optimization approach in its current business activities to the next level with ICRON.

In recognition of its excellence, ICRON was recognized in Gartner’s 2023 “Magic Quadrant for Supply Chain Planning Solutions.” This list of the global top 20 supply chain technology vendors was compiled by Gartner, a world-renowned technology research and consultancy firm.

ICRON is expected to contribute to Siseecam’s operational and financial performance with its already established digital infrastructure and its quality approach that fully meets today’s evolving technological needs.

GLASS FOR EUROPE: BOOST WINDOWS REPLACEMENT

To mark the start of the Renovation week organized by the Belgian Presidency of the Council of the EU, Glass for Europe released the second video of its policy Manifesto, focusing on the importance and benefits of windows and glazing upgrades in buildings.



January 15 was an important date to highlight the importance and relevance of high performance glazing in buildings. In addition to the start of the Renovation Week, which puts buildings energy efficiency issues at the front of the EU policy debate, Members of the Energy Committee of the European Parliament also formally adopted the agreement on the Energy Performance of Buildings Directive (EPBD), which was under discussion for several months.

The video released by Glass for Europe focused on the need to accelerate windows and glazing replacement as part of the EU Renovation Wave. In it, Jean Ries from Guardian Glass Europe and Davide Cappellino from AGC Glass Europe highlighted the numerous benefits of

window replacement on peoples’ wellbeing, energy and CO₂ savings from buildings.

Despite the welcomed legislative improvements brought by the revisions of the EPBD and the Energy Efficiency Directive, additional measures are needed to boost renovations. Renovation must therefore remain high on the agenda of the next European Commission. First, to ensure that the revised Directives are quickly implemented thanks to clear supporting guidelines. Member States’ National Building Renovation Plans also need to be drafted swiftly to reflect higher ambitions. Then, targeted initiatives on the work which help saving the most energy should be considered. Windows and glazing replacement are high on the list as they also directly contribute to people’s health and comfort.

The next Commission must also follow-up on the preparatory work which has been done on the life-cycle analysis of buildings. It is key to allow buildings to be built and renovated with products which have a reduced carbon footprint.

ŞİŞECAM WILL REDUCE CARBON EMISSIONS WITH AI TECHNOLOGY

Şişecam – committed to developing solutions for a sustainable world and more efficient production processes – began implementing the Glass Colour Optimization Project (CROP) with Artificial Intelligence and Machine Learning Methods. This initiative aims to eliminate colour issues during the manufacture of glass. The project will reduce production waste rates and resulting carbon emissions.

The forward-looking project is being carried out by a consortium that includes Şişecam, Koç University, TÜBİTAK Artificial Intelligence Institute and Analythinx. CROP aims to develop an infrastructure to minimize colour differences and to identify and quickly resolve the root cause of colour-related problems in glass production with artificial intelligence models. Designed to improve colour quality in the glass industry, the project will integrate advanced technology and artificial intelligence know-how into production operations



while expanding the country’s industrial knowledge base. CROP will start at the Şişecam Eskişehir Glassware plant and last for two years. This initiative once again demonstrated the value Şişecam attaches to innovation and continuous development. The project is expected to have a major impact through information transfer to other Şişecam plants.

CROP is one of 17 projects supported as a result of TÜBİTAK's 1711 Artificial Intelligence Ecosystem Call in 2023. The project includes modelling that will help manage the change created by artificial intelligence, achieve results to benefit humanity, produce value from artificial intelligence and achieve full independence in critical technologies.

FORMATOR CELEBRATES 20 YEARS



Formator, a producer of safety laminated glass, celebrated 20 years since its establishment. Its products have not only reached over 40 countries worldwide from Croatia, but have also garnered immense success and recognition. Formator Ltd was founded in 2003 by IMSA Group GmbH. From the very beginning, the company had a clear vision: to become a benchmark for special glasses, with a focus on turning the ideas and needs of architects and customers into reality.

Robert Miklus, co-founder and co-owner of Formator, explained, "Our spirit has always been to be a dynamic and customer-oriented company with a keen eye on innovation. This approach has allowed us to achieve significant milestones and contribute to the realization of globally renowned projects."



Robert and Giovanni Miklus

To date, Formator's laminated glass can be found in prominent structures such as "The Shard" in London, "The Vessel" in New York, "Tour Odeon" in Monte Carlo, "Freedom Bridge" in Georgia and "Doha Airport" in Qatar, among others. Moreover, over 80 ships worldwide are equipped with Formator laminated glass.



"The Vessel" in New York

Pioneers in the production of laminated glasses with SentryGlas® for the marine sector

In 2007, the company delivered laminated glasses with SentryGlas® interlayer for the Ruby Princess cruise ship.

Miklus added, "This was the first time that SentryGlas® was used in the marine sector, an environment known for its harsh conditions of salt, humidity and sun exposure. Over the years, its efficacy has been proven, leading to its increased use by different shipyards. Today, the use of SentryGlas® has become the norm in the marine sector."



Cruise ship "Ruby Princess"

Over the past fifteen years, the company has produced more than 2,500 units of heating glass, making it one of the European leaders in this specialized field. These heating glasses have been installed on over 80 ship wheelhouses, with a majority of them being cruise ships.

"At Formator, we have a dedicated area for electrically heated glasses, where we not only carry out production but also conduct tests and research," Miklus said. "In recent years, we have witnessed an increasing demand from the construction sector, where electrically heated glass can be utilized as a heating source. We offer our electrically heated glass under the brand name HeatVision®, and with the growing focus on zero-energy buildings, we anticipate strong demand in the years to come."



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