

Engineering

General Catalogue



EN

Flat Glass Technology

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we • glass

we • glass

We know glass, we love glass

As a global leader in flat glass and hollow glass processing technology, we have been helping to shape one of the most beautiful and useful materials in the world for over 60 years. Its unique qualities, combined with the passion for technology and innovation, guide us in seeking for newer and more effective solutions to improve and expand its use.

In over 60 years we've come a long way

We are a global partner

Established in Cuneo in 1957, Bottero is at present the only company worldwide leading both in flat glass and in hollow glass processing technology. With its exclusive know-how, Bottero designs and produces high-productivity equipment for processing flat glass of any type and thickness. Bottero equipment is particularly appreciated for its reliability in performing top production rates, typical of industrial fields like: automotive, household appliance, TV screens and mobile devices, solar panels and much more.



more than
50.000 installations
all over the world

With thousands of equipment installed all over the world, Bottero provides a top-notch sale and after sale service.



Thanks to the experience gained in the field with thousands of installations and to the continued and significant investments in research and development, Bottero gained the trust of many multinational corporations and of top-class industrial groups. The **international** scale of the company, its natural tendency to **innovations** and its **independence** on the market ensure Bottero the best possible condition in order to supply any Customer with tailored solutions for product processing optimization and with specific suggestions about investments in new production technologies.

Locations

8	Commercial locations
Bottero S.p.A. - Headquarter Cuneo - Italy	
Revimac S.r.l. Vicenza - Italy	
Bottero France SA Nice - France	
Bottero U.K Limited Rockdale - United Kingdom	
Bottero GmbH Grevenbroich - Germany	
Bottero Glass Industry Co. Ltd Shangai - China	
Bottero Flat Glass Inc. Kernersville - North Carolina - USA	
Bottero do Brasil S.Paolo - Brasil	

4	Industrial locations
Bottero S.p.A. - Headquarter Cuneo - Italy	
Bottero S.p.A. - Trana Torino - Italy	
Revimac S.r.l. Vicenza - Italy	
Bottero Glass Industry Co. Ltd Foshan - China	

6	R&D Centers
Bottero S.p.A. - Headquarter Cuneo - Italy	
Bottero S.p.A. Pesaro Pesaro - Italy	
Bottero S.p.A. - Trana Torino - Italy	
Revimac S.r.l. Vicenza - Italy	
Bottero Engineering GmbH Donauwörth - Germany	
Bottero Glass Industry Co. Ltd Foshan - China	

Float cutting lines

Float cutting lines to manage the glass ribbon from the exit of the annealing lehr. Bottero Optimization system interfaced with the quality inspection system optimizes the cuts according to stacking positions and glass quality defined in the production table. The lines can be classified according to their daily production capacity, starting from 250T/day to 1200 T/day. Glass production for electronic application (ultrathin thickness starting from 0.25 mm), for automotive application (thickness from 1.6 to 6 mm) and for architectural application (thickness from 3 to 19 mm).



Cutting

Cutting heads with latest-generation electromagnets for reliable pressure control and accurate clean cuts, for glass thickness from 0.25 mm for electronic application to 19 mm for architectural glass. Different cutting solutions from Jumbo sizes to small cut sizes (410 x 410 mm) thanks to the presence of longitudinal bridges with several cutting heads and to #5 cross cutting bridges. Cut lubrication system with focused oil flow straight on scores enables a minimal quantity of lubricant on glass and it's also suitable for high-evaporation oils.

"X" Breakout

"X" breakout system with contrast wheels for plate thickness from 1.6 to 19 mm. Dedicated systems for glass thickness above 19 mm. In this position a fast scrap eliminator can be installed.

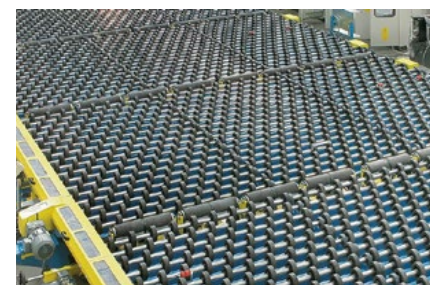


Selvage machine / trim deck

Transport conveyor system and breaking wheels for trim removal. The length of transport conveyors and the number of breaking wheels depend on glass dimension, on the number of trims and on the possibility of managing different glass widths at the same time.

"Y" dynamic breakout and separation

"Y" dynamic breakout groups and separation rolls installed under the glass transport level. The control system automatically positions the breakout units under the glass scores and it breaks and separates lites with high repeatability and speed in dynamic during the glass transport.



Geometric inspection system

Geometric inspection system to check the glass after the breakout areas. The system verifies the glass during the transport and sends the inspection result to the line control. The line control decides to send this glass either to the cullet or to the stackers area.

Drop conveyors for glass plates rejection

Transport conveyor systems with the possibility, by a drop function, to send to cullet the defective glass plates. The system can be single zone, double zones or selective zones according to the line configuration.

Unloading

Availability of different stacking solutions according to glass dimensions, glass contact surface, glass handling in warehouse and cycle time:

- For Jumbo sizes and special sizes up to 18 m.
- For small sizes till 410 x 410 mm.
- For air and/or tin side stacking.
- With traditional equipment and robot systems with pick on fly.
- High speed stacking system.

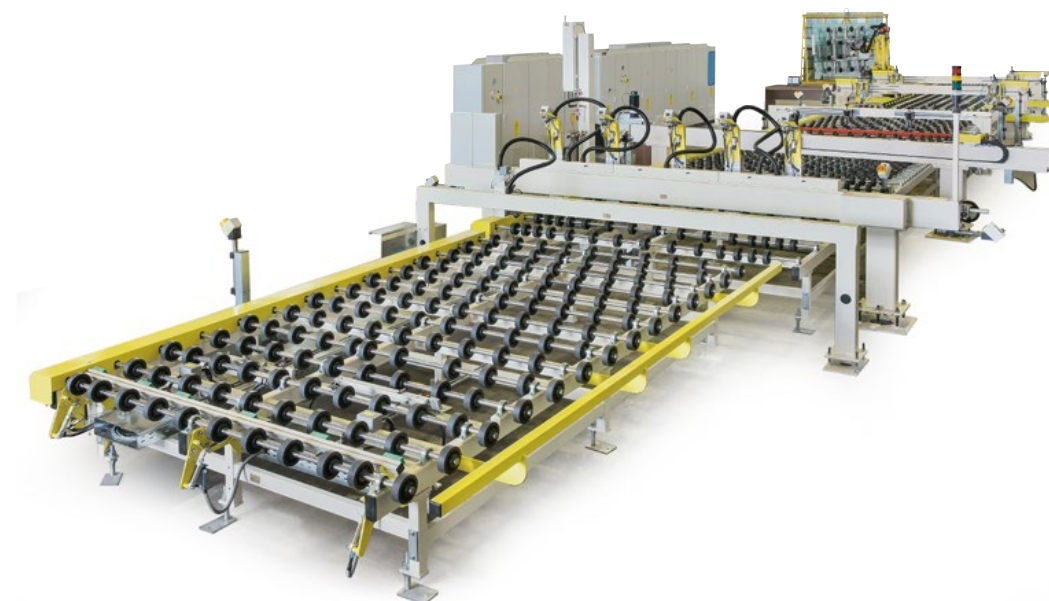
Line control

Line control based on PLC platform with different levels of redundancy. Optimization system with back-up connected with lines PLCs and quality inspection system. Servers/clients SCADA system for Human interface for cutting and stacking areas with synoptic and troubleshooting functions. Report system for production and process data analysis.



Patterned lines

Patterned glass cutting lines to manage the glass ribbon from the exit of the annealing lehr. Bottero optimization system interfaced to the quality inspection system optimizes the cuts according to stacking positions and glass quality defined in the production table. The lines can be classified according to their daily production capacity, glass thickness and sizes to cut.



Cutting

Cutting heads with latest-generation electromagnets for reliable pressure control and accurate clean cuts, for different glass thicknesses. Cut lubrication system with focused oil flow straight on scores enables a minimal quantity of lubricant on glass and it's suitable also for using of high-evaporation oils.

"X" Breakout

"X" breakout system with contrast wheels. In this position a fast scrap eliminator can be installed.

Selvedge machine / trim deck

Transport conveyor system and breaking wheels for trim removal. The length of transport conveyors and number of breaking wheels depend on glass dimension.



"Y" dynamic breakout and separation

"Y" dynamic breakout groups and separation rolls installed under the glass transport level. The control system automatically positions the breakout units under the glass scores and it breaks and separate lites with high repeatability and speed in dynamic during the glass transport.

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Laminated production lines

Processing lines to produce laminated glass plates. Laminated glass is used in IG unit and in other architectural applications for its safety features. This product is the result of two or more plates assembled with plastic foil (PVB) between them. After autoclave process, the glass is processed on inspection lines and stacked on final racks.



Loading

The glass plates are loaded on lines with different type of loading systems, according to glass sizes, types and numbers of racks and cycle time of the line. Loaders can be traditional systems and/or robot solutions.

Glass transport

Synchronized conveying systems to move glass plates along all line areas. Customized solutions according to factory layout and customers' needs. These solutions can include accumulators, LES rotators and cutting systems.

PVB storage

Line control automatically manages the PVB storage with 6 interchangeable rolls and self-fitting pre-unwinding system according to the size of processed plates.

PVB unwinding system

PVB unwinding system with device to reduce air quantity between PVB and glass plate. Multi-layers unwinding possibility.

PVB trimming

Automatic bridges for the trimming of all 4 edges through a rotary disk for a continuous, fast and accurate finishing without damaging the glass edges.

Oven and nip rolls

Modular system for pre-oven and oven with infrared lamps. The modular system gives the possibility to customize the solution according to glass type and line cycle time.

Nip rolls with automatic positioning and automatic pressure set-up according to the glass thickness.

Unloading

After the pre-laminated process, the glass plates are unloaded on special racks for autoclave. During the glass unloading, the stacker or a dedicated equipment arranges the spacers to separate the glass or the packs on the autoclave rack.

Line control

Line control based on PLC platform.

Server/clients SCADA system for Human interface for all areas with synoptic and troubleshooting functions.

Report system for production and process data analysis.



Handling for coater

Processing lines to apply different material layers on the glass surface to increase thermic insulation values for architectural and automotive applications. Bottero supplies the handling glass system of this process.



Loading

Glass plates are loaded on lines with different loading systems according to glass sizes, types and numbers of racks and cycle time of the line. Loaders can be traditional systems and/or robot solutions.



Glass transport

Synchronized conveying systems to move glass plates along all line areas. Customized solutions according to the factory layout and the customers' needs. These solutions include accumulators, LES rotators and cutting systems.



Unloading

The glass plates can't be touched on the coated surface after the coating process, therefore there are dedicated stackers that unload the plates taking the glass from bottom side only.



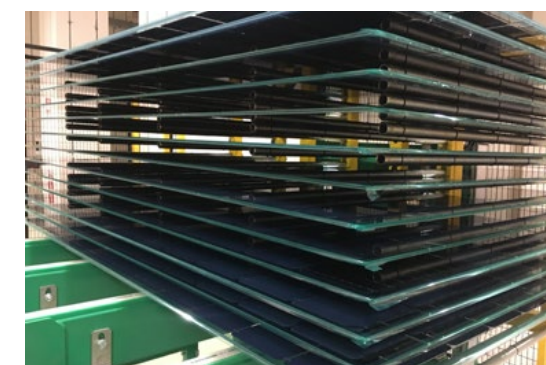
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Solar processing lines

Processing lines for assembling mono- or bifacial or thin-film photovoltaic modules. The lines consist in several zones, where Bottero is both supplier and system integrator.



Loading, laser marking & washing of front glass

Glasses composing the module are loaded onto the line thanks to anthropomorphic robots and washed by special washing units.

Eva laying, stringers

The first EVA layer is laid on the plate. Top rate stringers weld/glue the 10- 12-cell strings. An anthropomorphic robot takes the string from the stringer, takes it to the electroluminescent quality inspection and then releases the welded string onto the glass plate. In the following automatic station strings are connected one another thanks to ribbons that are fully automatically cut, bent and welded in the correct position by means of welding robots.

Then the second EVA layer is laid and the second glass - in case of bifacial module - or the Tedlar layer in case of standard module - is coupled.

Lamination

In the following station the electroluminescent quality inspection test is carried out before the entry into the lamination system; then the automatic bending of the ribbons and the automatic application of the protective tape on the edges of the modules is performed.

Lamination is executed in top production rate lamination furnaces where 4 modules at a time are usually treated.

Once the module comes out of the lamination system, the protective tape is removed and trimming is carried out by means of heated blades.

Quality inspection and packing

At the end of the line the lateral frame or back rails are automatically applied. J-Box can be applied in manual or automatic mode as well.

Quality controls are then performed on- or off-line in order to class the finished module through Sun simulator; High Voltage and Electroluminescence Test are carried out; the software for data storage and for module classification is directly connected to the inspection systems.

Furthermore along the line manual inspection stations are available, as well as reworking stations and the storage buffer, in order to assure the correct rate of the different processing phases.

At the end of the line an automatic sorting system is available in order to sort the product by power classes; automatic packing by means of robots piles the product on pallets and boxes.

Moreover, automatic and semiautomatic options are available for strapping, taping and application of labels on finished pallets.



Handling for mirror

Processing lines for mirror glass production. Bottero supplies the handling glass system of this process.



Off-line cutting

Processing lines to cut the Jumbo or LES sizes in final cut sizes for the automotive market.



Packing lines

Loading, unloading and packing solutions.



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via Genova 82 - 12100 Cuneo - Italy

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Trana - Italy

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Pesaro - Italy

Revimac S.r.l.
Vicenza - Italy

Bottero GmbH
Grevenbroich - Germany

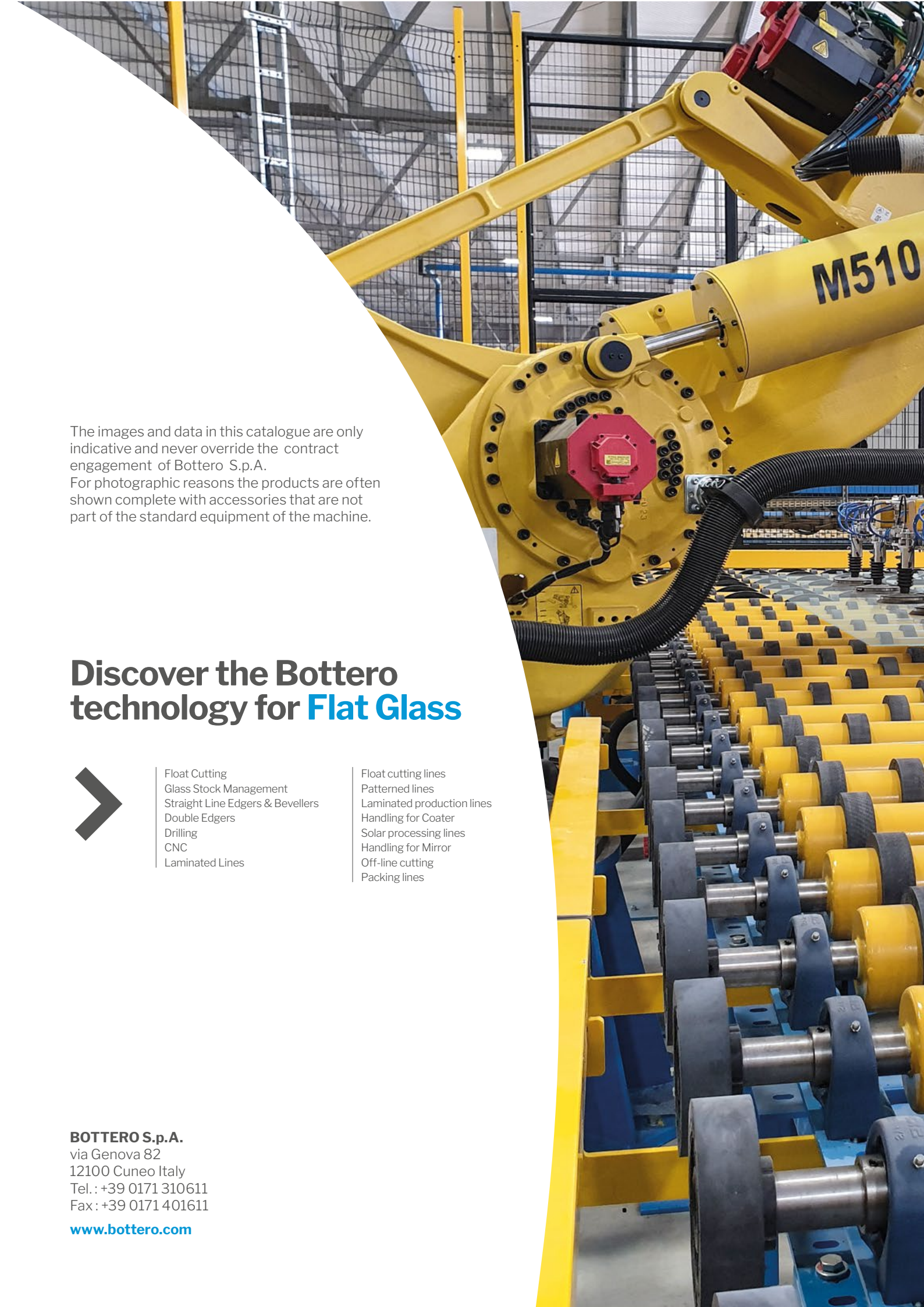
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Rochdale - Great Britain

Bottero France SA
Nice - France

Bottero do Brasil
S.Paolo - Brasil

Bottero Flat Glass Inc.
Kernersville - North Carolina - USA

Bottero Glass Industry Co. Ltd
Shangai - China



The images and data in this catalogue are only indicative and never override the contract engagement of Bottero S.p.A.
For photographic reasons the products are often shown complete with accessories that are not part of the standard equipment of the machine.

Discover the Bottero technology for **Flat Glass**



- Float Cutting
- Glass Stock Management
- Straight Line Edgers & Bevellers
- Double Edgers
- Drilling
- CNC
- Laminated Lines

- Float cutting lines
- Patterned lines
- Laminated production lines
- Handling for Coater
- Solar processing lines
- Handling for Mirror
- Off-line cutting
- Packing lines

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