IOCCO

Glass Technologies

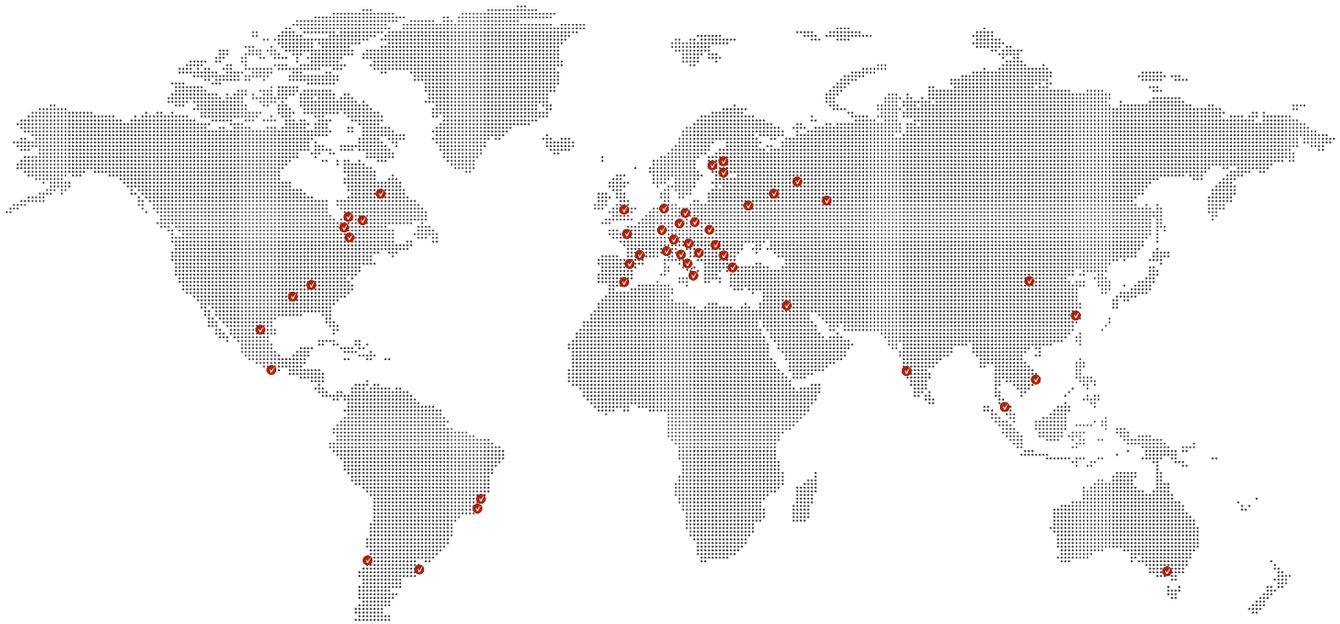
www.ioccogroup.com

Every day IOCCO's Know-How is addressed to the customers needs.
Customers represent the confirmation on our excellent quality and reliability.

IOCCO drives state of art technology

The mission to deliver the best solution to the Customers starts from collecting their needs, then designing machines and successfully performing implementations. The entire IOCCO team is used to accept the most demanding challenges for turning them into the most efficient solutions for both costs and performances.

Thanks to our pluriannual experience in the advanced glass industry and our expert engineers and specialists, the range of solutions offered by IOCCO is very large and covers all Customer's needs, from the simplest machinery to the most complex production lines for Float, Flat and Automotive glass plants.



Worldwide installations

www.ioccogroup.com

100% made in italy

Hi Technologies for glass processing

IOCCO offers a complete range of solutions in the field of automatic machines for glass processing, thus meeting all your requirements, by designing and building from simple and stand alone machines up to entire production lines.

IOCCO is able to provide experience and high technology in any field of the glass processing industry by supplying equipment to each specific production, from Float and Flat glass up to lines and machines for Automotive glass, and lines for production and packaging as well.

Products and Solutions

Equipment and complete plants for AUTOMOTIVE GLASS INDUSTRY

Equipment and complete lines for ARCHITECTURAL and APPLIANCE
Ancillary machines for FLOAT bath furnace

a *Competent Partner* in the automotive glass industry

Thanks to the collaboration over the years with the biggest multinational automotive glass makers, Iocco is able to offer integrated solutions for glass processing equipment.

Our Company benefits from highly competent glazing technology and managing expertises to meet our Customers' expectations. In this way our projects will succeed in improving your capability, increasing the productivity of your plant, reducing waste, optimizing the quality of your products and so the return of your investment.

Iocco is able to interface its machines with the majority of hardware and software systems currently existing in the market, and can rely on a range of solid Tier 1 suppliers, guaranteeing high standards in terms of energy saving and safety.

Equipment and complete lines for backlites and sidelites

The tempering process of automotive glass through a dramatic cooling after bending allows the glass to be much stronger and safer. Iocco offers a wide range of machines and equipment to process tempered glass, and integrates complete lines with tempering systems, unloading and inspection stations always according to Customers' expectations.

Quality standards and Customer's satisfaction are our priorities.

We design and manufacture pre-process line solutions according to customers' requests and specifications.

Customers can rely on our state-of-the-art.

Areas of expertise

√ pre-process line
√ bending and tempering
√ final, inspection & packing line
√ value added operations ''AVO''

Pre-process line and machines

- √ robotic loading
- √ diagonal cutting
- √ handling connection for grinding machine
- √ integration of grinding machine
- √ drilling
- √ handling connection with washing machine
- √ integration of washing machine
- √ handling connection with printing machines
- √ integration of printing machines
- √ handling connection with uv/ir oven
- √ integration with uv/ir oven
- √ inspection
- √ storing
- √ connection with tempering furnace

Preprocess phase consists of those activities made on glass preliminarily to the bending and consequent tempering.

After loading, the glass through handling machines is transferred to cut, including Diagonal cutting, breaking and grinding machines, and then to washing and printing machines. Iocco is able to design and supply handling connections for grinding machines and also to perform integration of grinding machines, drilling machines, handling connection with washing machines, integration of washing machines,handling connections with printing machines and integration of printing machines as well.

The preprocess line includes also drying systems for paints, and then part of Iocco's task is to supply the handling connection with UV/IR ovens, and to perform the integration with UV/IR ovens. Inspection phase is part of the quality process to ensure the best printing quality, usually included into the printing room. It is opportune the production line is equipped with storing systems to guarantee the glass flow continuity, directing it towards the bending by means of connection with tempering furnace.

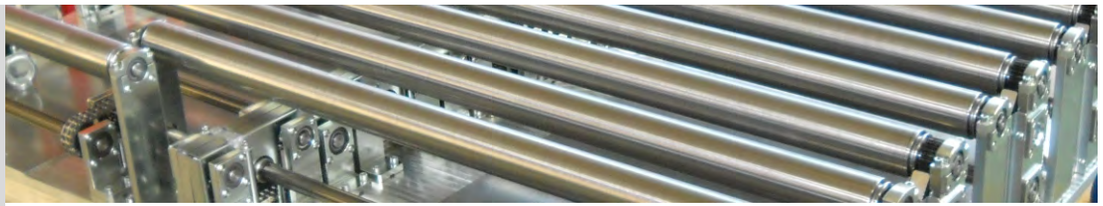
Bending and tempering

After being heated at the right temperature, glass is bent into the Press system and immediately cooled and tempered.

Iocco designs and builds different kinds of press systems in accordance with glass model and features.

A fundamental component in the tempering phase is the Blowing system whereas essential parts of the bending process are the Mold system and the Cooling system, designed and built according to different glass model and features.

- √ press system for bending and tempering
- √ roll form system for bending and tempering
- √ blowing system
- √ mold system
- √ cooling system



Final, inspection & packing line

√ sorting
√ shaping check
√ picking station centering machine
√ flip over unit machine
√ inspection lighting panel
√ trimming paper machine
√ application paper machine
√ spacer application machine
√ tranfer packing machine
√ rotating packing table
√ powder machines

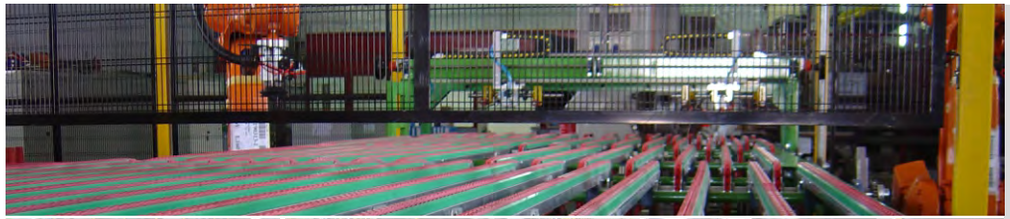
Once glass has been shaped, it can be unloaded either by means of pick and place robotic systems or overhead transfers. Glass is subsequently transported through a Sorting line towards the Shaping Check to guarantee the correspondence with requirements.

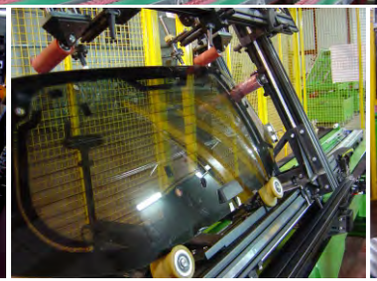
In order for glass to be inspected and packed, different equipment is needed for the proper handling, like: Picking Station Centering Machine, Flip Over Unit Machine and Inspection Lighting Panel.

When glass is packed using paper, a dedicated machine is placed to perform the Paper Trimming and Application.

Otherwise a different type of packing is carried out using the Spacer Application Machine.

Transfer Packing Machine and Rotating Packing Table are able to guarantee the required handling where necessary. Finally Powder Machines are normally used for flat glass.





Equipment and complete lines for laminated windshields and sidelites

The request worldwide for laminated automotive glass has increased in the past few years, enlarging the use of safety and acoustic glass in different and further fields than before. Iocco has seized this opportunity and constantly updates the range of possible engineering solutions to offer to automotive glass makers accordingly.

The extensive expertise our Company in Laminated automotive glass provides ranges from the single machine (such as the Vinyl unwinding machine) up to more complex lines (such as Assembly lines, bag furnace, on line application of components, Autoclave lines, PVB trimming, Inspection Lines for windshield, sunroof, sidelight, with automatic unloading and packaging system). This in order to ensure the best process improvement for our Clients, guaranteeing the most customizable layout integration in line with safety regulations.

Iocco is integrator of the main vision systems, ensuring the highest quality standards to the glass inspection process.

Of course the solutions we provide can be customized thus our Customers throughout the project phases.

Areas of expertise

√ pre-process line
√ assembly process
√ deairing process
√ final, inspection & packing line
√ value added operations ''AVO''

Pre-process line and machines

√ robotic loading
√ handling connection for grinding machine
√ integration of grinding machine
√ handling connection with washing machine
√ integration of washing machine
√ handling connection with printing machines
√ integration of printing machines
√ handling connection with uv/ir oven
√ integration with uv/ir oven
√ inspection
√ storing
√ connection with bending furnace

Preprocess phase consists of those activities made on glass, preliminarily to the bending and consequent assembly.

After loading, the glass through handling machines is transferred to cut, brake and grinding machines, and then to washing and printing machines.

Iocco is able to design and supply handling connection for grinding machines and also to perform integration of grinding machines, handling connection with washing machines, integration of washing machines, handling connection with printing machines and integration of printing machines as well.

The preprocess line also includes drying systems for paints, and part of our task is to supply the handling connection with UV/IR ovens, and to perform the integration with UV/IR ovens. Inspection phase is part of the quality process to ensure the best quality of the printing, and usually is included into the printing room. It is opportune the production line is equipped with storing systems to guarantee the glass flow continuity directing it towards the bending by means of connection with bending furnace.

The advantage of integrating the different preprocess equipment guarantees to the Client the plant total management through a sole supervising software.



Assembly process, line and machines

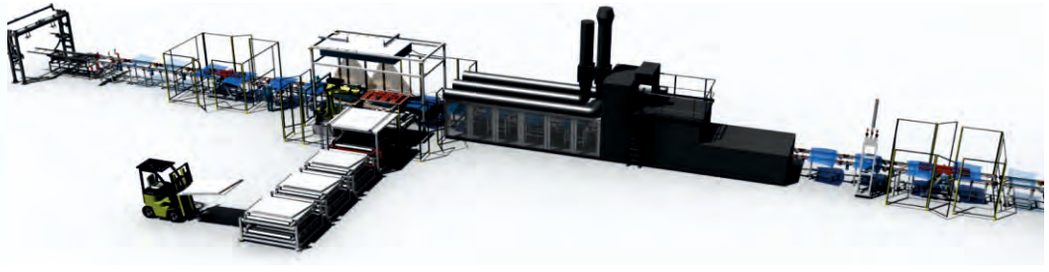
Shaping Check is a preliminary phase glass is subject to, before assembly. Grid check follows to ensure the integrity of the printing circuit, where existing. Before washing, the pair of glasses is divided and flipped wings down to better remove possible impurities.Once the pair of glasses is bent, bending furnace unloading is performed by dedicated equipment in order to free the mold from the glass.

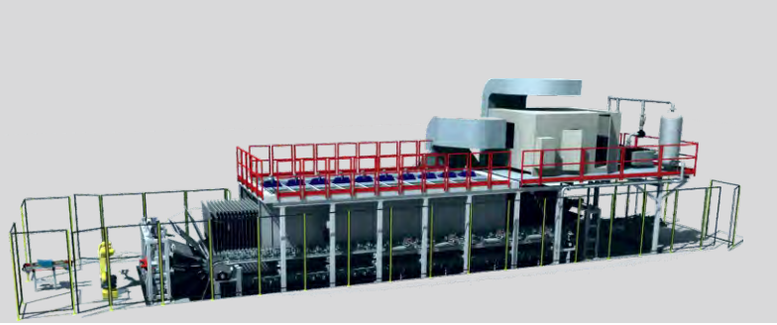
In the meantime PVB Pre-Processing – Trimming and Lay Up phases take place to unwind and accumulate vinyl interlayer. This is subsequently stretched to best adhere to glass, then it is cut, stored on trays and handled through an automatic tray feeding system to ease the PVB Glass Assembly by the operators in the assembly room. The Assembly can be performed either automatically or semi-automatically.

The pair of glasses undergoes a Pre-Pressing phase to keep the right alignment between inner and outer glass.

A fundamental step in laminating production is the De-airing process.

√ bending furnace unloading
√ grid check
√ pvb-trimming machine and lay up
√ assemby line pvb-glass
√ pre pressing





Deairing system-bag and ring furnace

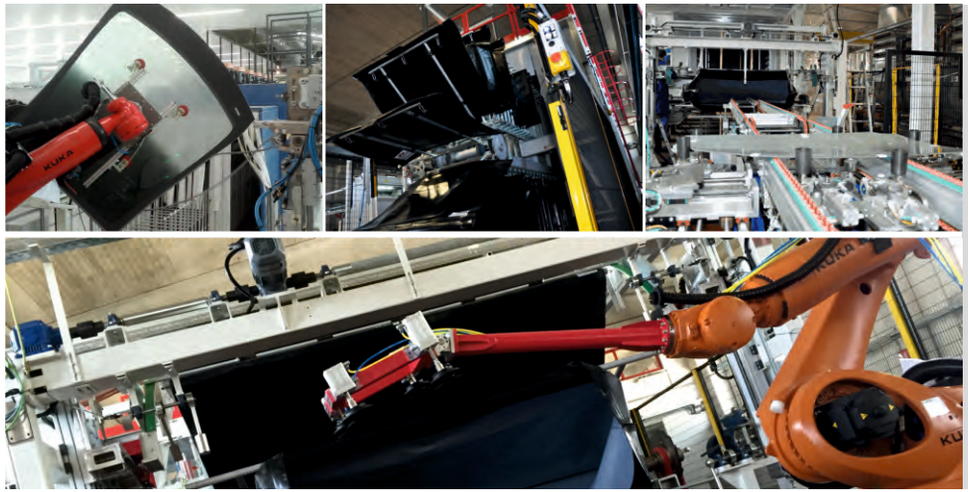
a fundamental step in laminating production

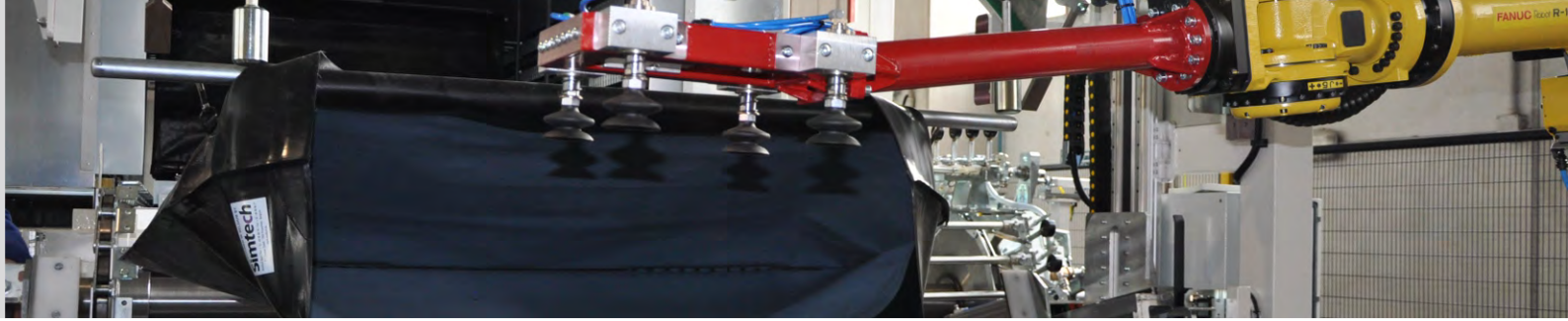
√ laminating «deairing» bag furnace
√ laminating «deairing» ring furnace
√ laminating «deairing» furnace to process hi-tech Windshileds and Sidelites in lock step
√ check after deairing

the De-airing process to be obtained through either Vacuum Bag Furnace or Vacuum Ring Furnace.

The two mentioned systems adopt different technology and grade of sophistication according to the production needs, in terms of flow rate and manpower, and require significantly diverse financial commitments.

Once Deairing is completed, Check After Deairing is performed and glass is generally subjected to Mirror Boss and Rain Sensor Applications in case of windshields, using different technologies. With regard to sunroofs and sidelights, other types of components and devices are applied.
Automatic Loading and unloading autoclave conveyor system allows a continuous feeding into autoclave.





DEAIRING bag furnace for windshields & sidelites

continuous R&D activity to be the first in the worldwide market

The needs to maximize product quality and to increase cost saving are getting step by step more pressing from primary worldwide car manufacturers.

In accordance with their specific requirements and considering what biggest worldwide glass makers need, the qualified IOCCO Team – together with international partnerships – performed a reengineering of the traditional vacuum bag furnace adopting deairing process to which the automotive laminated glass are subjected.

The final goal was to define 2 solutions for windshields and 2 solutions for sidelights, modular and highly performing, having reasonable costs and a financial return of investment in about 48 months (24 hours per day). Today said solutions have been finalized and put into operations at the plants of our customers.

As TOP configuration, our vacuum bag furnaces include the tracking production data up to single glass, by the light of current requirements of primary worldwide car manufacturers.

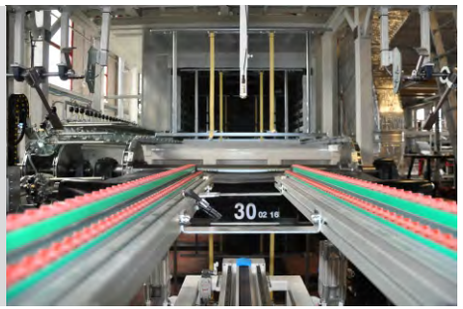
All our solutions allow our customers, through sustainable investments, to increase their production in accordance with the performances agreed in the original request.

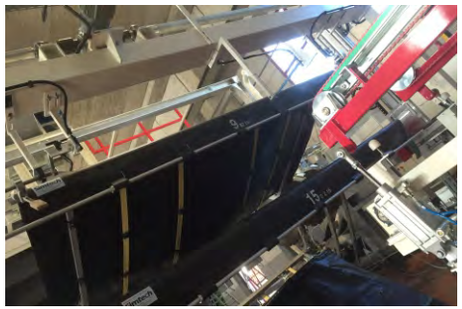
Main advantage of the vacuum bag furnace is to produce in full automatic way different kinds of glass, even having complex and asymmetric shapes, and avoiding heavy interventions for change-overs.

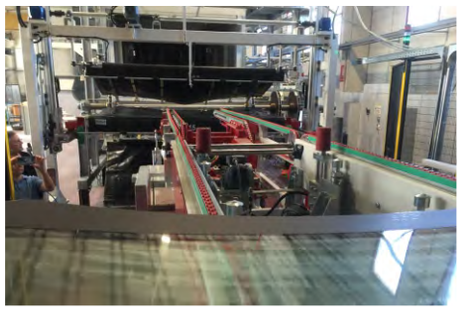
During the design and the fabrication particular attention has been dedicated in choosing and checking the installed commercial parts: in fact, all the components making part of the furnace are supplied by global companies, leaders in their specific field.

Thanks to the complete redesign, all maintenances prove to be small and simple to do.

As accessories of the vacuum bag furnaces, IOCCO is also able to provide both low-vacuum checking systems and different loading and unloading equipment.







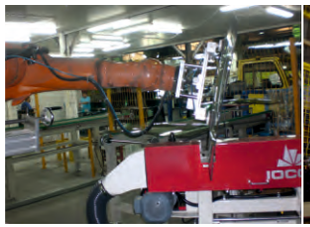
Final, inspection & packing line

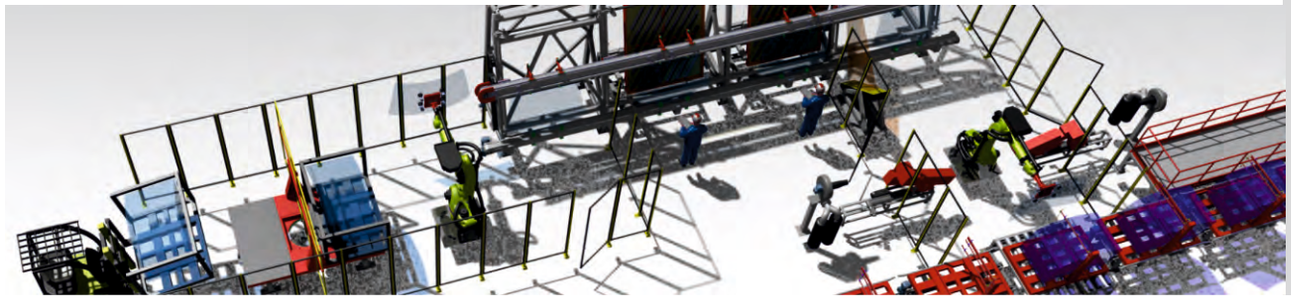
√ shaping check
√ loading/unloading autoclave conveyor system
√ pvb trimming
√ final inspection line
√ packing line

At the exit of the Autoclave, laminated glass undergoes PVB trimming operation and, after final

washing, enters Final Inspection Line, consisting in both visual and optical checks. Iocco is able to integrate multiple optical Vision Systems.

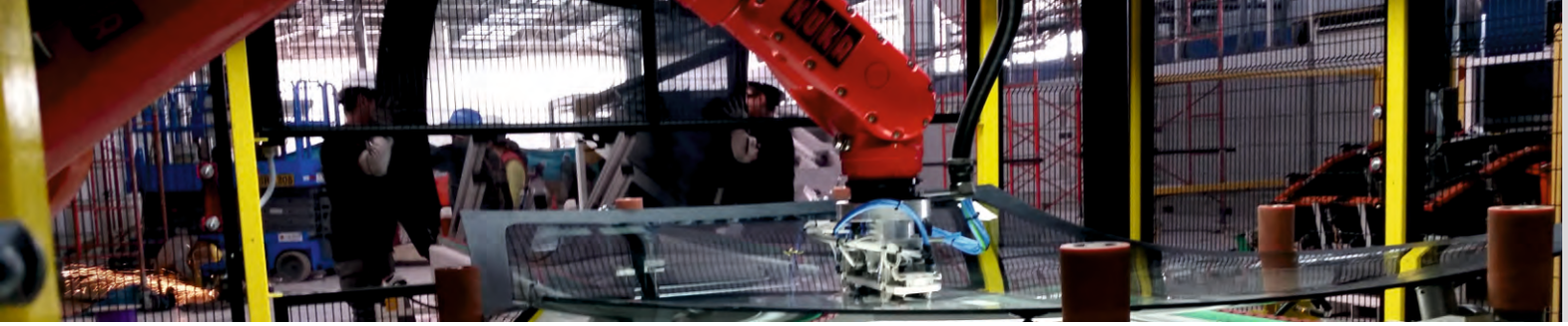
Finally glass is handled and then packed into a dedicated station automatically.





Value added operations -AVO-

High quality and a continuous innovating approach
that is the drive of our organization



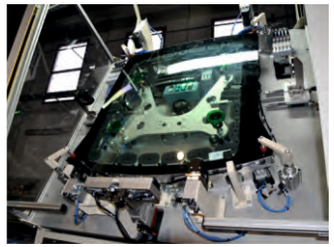
Value added operations -AVO-

Value added operations-AVO- consist in all those operations performed on the naked glass just produced, before it is delivered to the automotive company ready to be assembled on the car. The use of Value added operations-AVO- and their consequent complexity have risen in the recent years; as a matter of fact they were once performed directly by the car company at its premises, while they are now carried out at the glass maker's site. Iocco provides the major automotive glass manufacturers with specific and state-of-the art solutions, advising and giving directions throughout the different phases of the project because it's the expertise that makes the difference.

The area of value added applications currently counts more and more sophisticated operations. Some of them may be applied basically to all car glass set, whereas our technological expertise may study specific solutions involving just one particular glass. In order to offer an esthetical seal between glass and body car, it is carried out on the glass periphery the Polyurethane extrusion, in particular on windshields, side fixed windows, backlights and roofs, by means of an application cell to be customized according to Client's requirements.

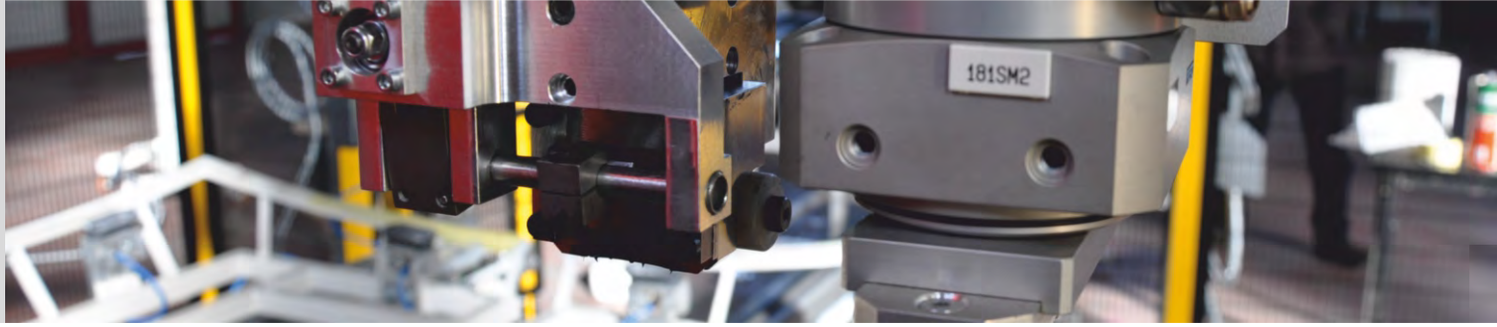
Furthermore, seals and/or bond on lace and finishers assembly can be applied on windshields, backlights and roofs, so to reach esthetical requests and functional needs of the car company.

The assembly cell to apply centering pins and spacers is another type of application, involving windshields, side fixed glass, backlights and roofs. Pins are fundamental to ensure the proper setting on the body car, whereas spacers guarantee the gap with the car body while the glue is polymerizing. Recent trends in the automotive industry impose the endowment of several devices on glass, aiming at increasing the driver and passengers' comfort and safety.



Part of these devices are placed on windscreens (rain sensors, light sensors, distance detecting cameras, etc.), others are located on either side fixed glass or backlights (for instance alarm, fax and antenna connectors), depending on the car companies. A dedicated assembly machine for brackets/pins and connectors is designed and build on purpose, according to the specific need. The manual vs automatic or semi-automatic process is customized accordingly.

Side-fixed glass and backlights are usually assembled on the body car using a plastic frame. Such frame is obtained by the Encapsulation process, consisting in a thermoplastic press where glass is inserted and a plastic material is co-molded all around it. This kind of machine is very complex, consisting in the press and PU, PVC or TPE feeding systems plus relevant accessories. Upon request, a dedicated station for the glass preparation can be provided to perform cleaner and primer application.



Ancillary stations, once the encapsulation has been performed can be considered to perform the finishing, the final cleaning of the gasket around the glass, the eventual long life primer application and final packing.

The encapsulation process technology involves both side fixed windows and backlights.

A great part of technical features are shared between these two kinds of glass, although in case of backlights it is required a more specific attention due to glass dimensions, avoiding possible breakages.

Finally, long life primer application is a common feature involving various types of glass(windshields,side fixed glass, backlights).

This sophistication is often required by car makers wishing to accelerate the glass assembly on the car body.

Therefore the glass maker applies a layer of long life primer that will be active for several weeks after its laying but, as a particular and delicate product, requires maximum attention and a dedicated felt or sponge to be applied on glass.

The following operations are carried out on the single type of glass:

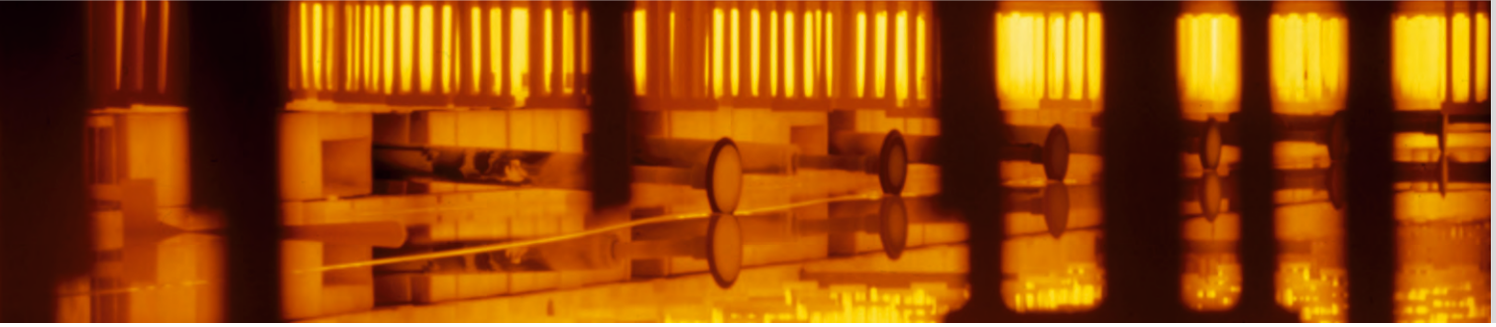
- *Mirror Boss* Assembly allows the setting for the mirror onto the windshield, requiring a dedicated cell.
- *Holder* Application and Skate Application are performed on side lifting glasses. More specifically, the holder connects to the lifting mechanism to ensure the sliding of the side glass and is usually applied on it by a semiautomatic stand alone machine.

  The skate or sliding guide is a specific technical solution adopted by some car makers, it is assembled on the glass having a small hole and connected to it through a plastic pin.
- *Bright finisher* assembly is performed on the fixed sidelights and is a very delicate operation due to the high value of the finisher. The process can be either manual or automatic, with the help of robotic systems.
- *Grommet assembly* is performed on backlights, guaranteeing a waterproof seal of the hole used to apply the wiper and its motor onto glass.The process can be either manual or automatic.

Iocco can rely on a skilled engineering team, studying and formulating customized solutions for the whole car glass set.

√ Bright finishers assembly
√ Centering pins and spacers assembly
√ Long life primer application
√ Polyurethane extrusion on the periphery
√ Seals, bond on lace and finishers assembly
√ Alarm, fax, antenna, heating circuit connectors assembly
√ Grommet assembly
√ Assembly and gluing of various accessories (bars,centering pins,spacers,…)

√ Polyurethane extrusion on the glass periphery
√ Brackets/pins application supporting various devices
√ Seals, bond on lace and finishers assembly
√ Long life primer application
√ Mirror boss assembly
√ Centering pins and spacers assembly
√ Holders application
√ Spacers application
√ Encapsulation (PU, TPE, PVC)



Float bath furnaces

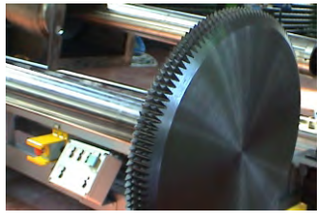
where glass originates from

Float process is the consolidated technique to produce glass from the specific combination of raw materials such as soda and ash with recycled glass (cullet), melted into the furnace at approximately 1500°C. The molten glass coming out of the furnace is then delivered smoothly and continuously to the float bath, where tin allows the uniform thickness of the glass ribbon, making it solid. While moving smoothly on rolling conveyors the glass ribbon is further cooled through the annealing lehr, allowing the perfect flatness and solidity.Finally glass is cut into jumbo size sheets, before being stacked for transportation or other production phases.
There are various inspections on glass addressed to ensure the best optical quality in each phase of the process.
Originally the glass produced was 6mm thick, but now it is possible to vary the thickness of glass from 0,4 mm to 25 mm, modulating the speed of glass exiting the bath.

-Ancillary Equipment in hot zone

Tweel

Carriages for Exit Cooler



Top Rolls

Barrage

Stirrer

Fence and Pusher

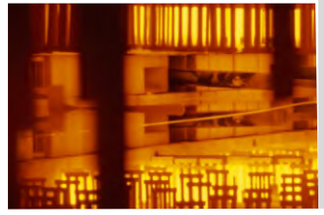
Fixed & mobile Periscopes

Cooler

Side sealing

Waste cooler

Carriages for Head Cooler



Safety barrier, Carbon flag, Tin cooler

Float cutting line

machines and equipment for cold repair

-Cold end

Breakout

Powder application

Unloading machines

Package

Conveyors

Insertion of spacers

Crusher & Scraps treatment

Crusher

Cutting-off edge

On-line machine to remove
Top-Tin & Oxide deposits

Automatic storage system and end caps packing area

The purpose of this system is to manage automatically the naked packs of sheets glass, deposited on stillages, coming from Float cutting line to facilitate the operators making the wooden caps and to deposit the pack into the racks ready for shipping
The system is composed of the following ITEMS:

Item 1) End Caps assembly machines"tilting tables"
Item 2) Storage system
Item 3) Loading Crane

+100% **increasing your business**

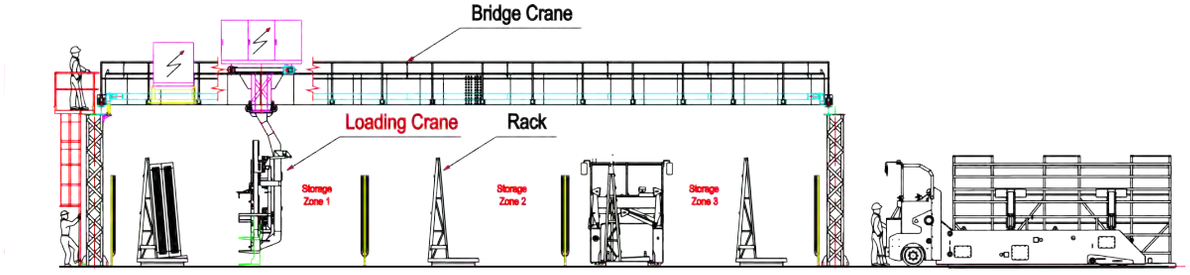
- Standard production detected on plant by our main customers: 300 Tons in 24 hours of production
- Production with storage system solution to manage glass packs: 600 Tons in 24 hours of production

0% **accident risks of employees**

- Management and handling in complete safety area thanks to complete absence of worker

-50% **decreasing your production costs**

- Production workers storage system solution to manage glass packs: No. 3 production workers to process 200 tons



storage system

End Caps Assembly machines“Tilting table”

The purpose of this item is to get the naked packs of sheets glass in vertical position, to tilt them in horizontal position and to facilitate the operators making the wooden caps pack.

After that glass packing has been done, it’s taken from crane or multidirectional sideloaders vehicle and deposited on the stillages in storage area.

The END CAPS area is composed of tilter unit .

The machines to be supplied shall be designed and manufactured to obtain the semi-automatic tipping of glass packs from sub-vertical to horizontal position. The structure is composed of electrically welded steel profiles, properly sized to support loads.

Two linear actuators controlled by electric CA motors, allow arm tipping.

Two further linear actuators, controlled by electric CA motors rotate the supporting heels to put them in operational conditions.

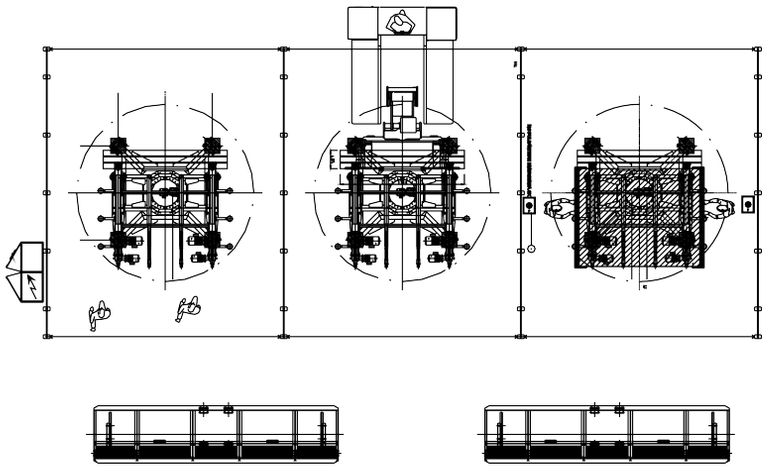
The base planes are all coated with adiprene to allow correct contact with the glass.

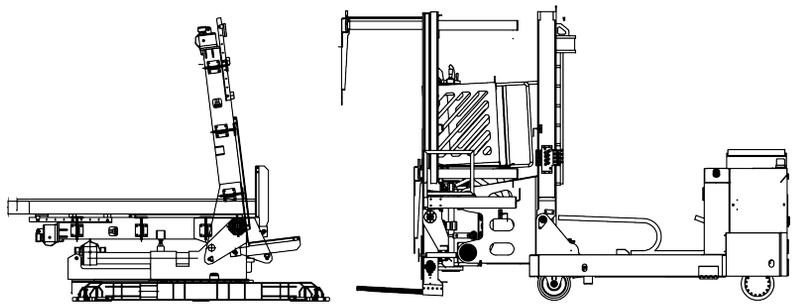
An hydraulic fall arrest system stops the machine in position to carry out its maintenance and prevent possible unespected incidents.

tilting table

end caps

wifi touch panel



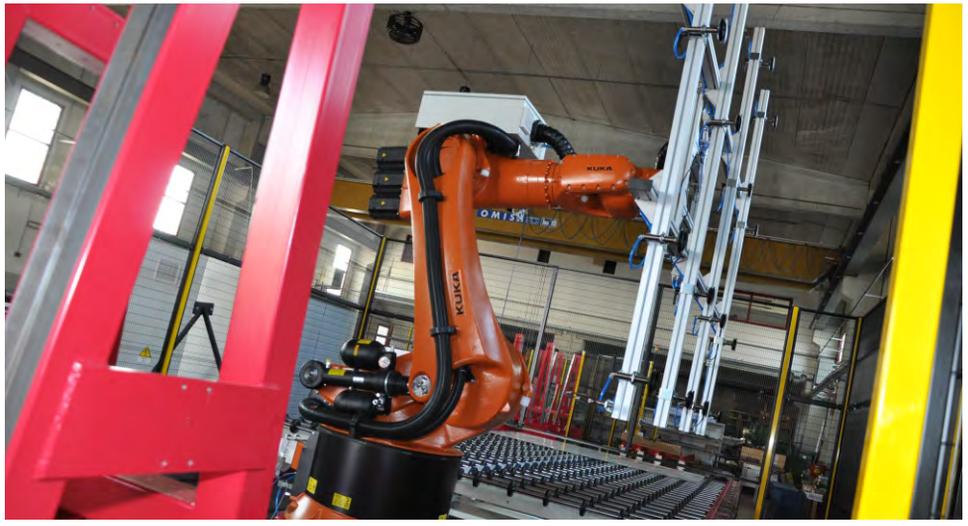


ARCHITECTURAL and APPLIANCE

complete lines for flat glas

The use of glass in architecture has broadened over the last years, as well as the requirements in glass processing, quality features and sophistications. We are specialized in processing lines & machines, Architectural & appliance glass.

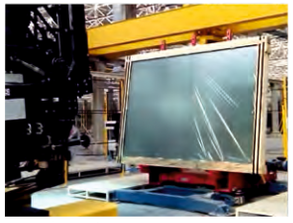
Our product offer ranges from the single machine up to complete lines in turnkey solution.



Cutting and breaking

Acid etching

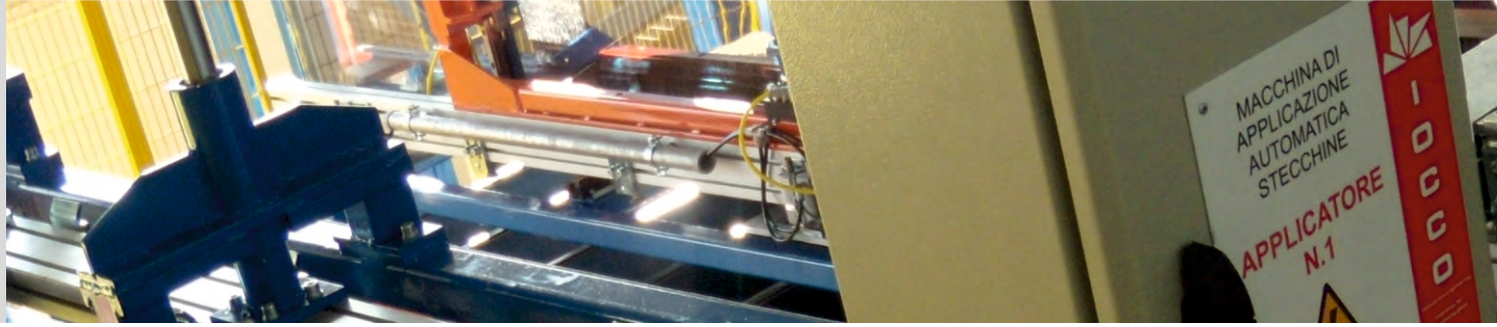
Glass tempering



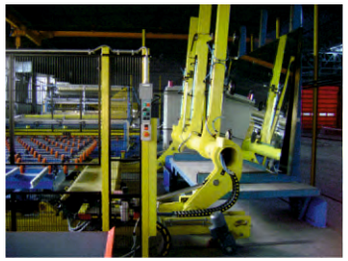
Packaging

Mirror safe

Handling for processing



stand alone machines



Loading and Unloading

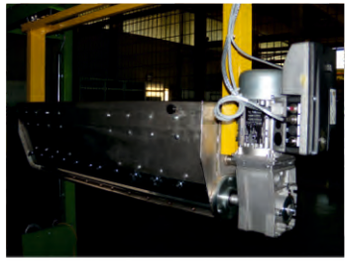
Automatic storing

Packing

Polishing

Loading stands

Sorting



Powder application

Spacers application

Conveyors

Line stackers

Powder removing

Scraps treatment

Services at IOCCO

THE CUSTOMER IS OUR LIFE, CUSTOMER'S LIFE IS ON THROUGH OUR INNOVATIVE SOLUTIONS

The success of our Customer's project is our success. We are available when you need us, therefore we provide After-Sales Service and continuous after sales Support.

After-Sales

- Spare parts according to the spare parts list
- Technical-practical training
- Remote assistance
- Preventive maintenance, both ordinary and extraordinary
- Refitting
- Customized Techinical Manuals

After-Sales Service

phone +39.0873318330

fax +39.0873319688

e-mail: service@ioccogroup.com

System certification
ISO 9001:2008

KUKA | Official System Partner

After Sales Service

Iocco, beyond the supply of machines, equipment and complete lines, provides a useful and professional training to operators, transmitting the knowhow to use properly the full potential of the products supplied. A complete training implies efficiency in the use of machines, so that trainees are proficient and skilled when running them.

Spare Parts List

We provide our Customers with a spare parts list to guarantee the best efficiency of the supplied equipment. Our suggestion is to purchase the spare parts listed and keep them in stock for future needs.Iocco can even supply spare parts to Customers upon specific request.

After Sales Support Enhanced

If necessary, our specialists are available for extra training sessions to update the workforce with new skills and to improve production and safety issues.

Customized Techinical Manuals

Following machine commissioning, each Customer is provided with a customized digital and hard copy manual, tailored to the specific equipment.

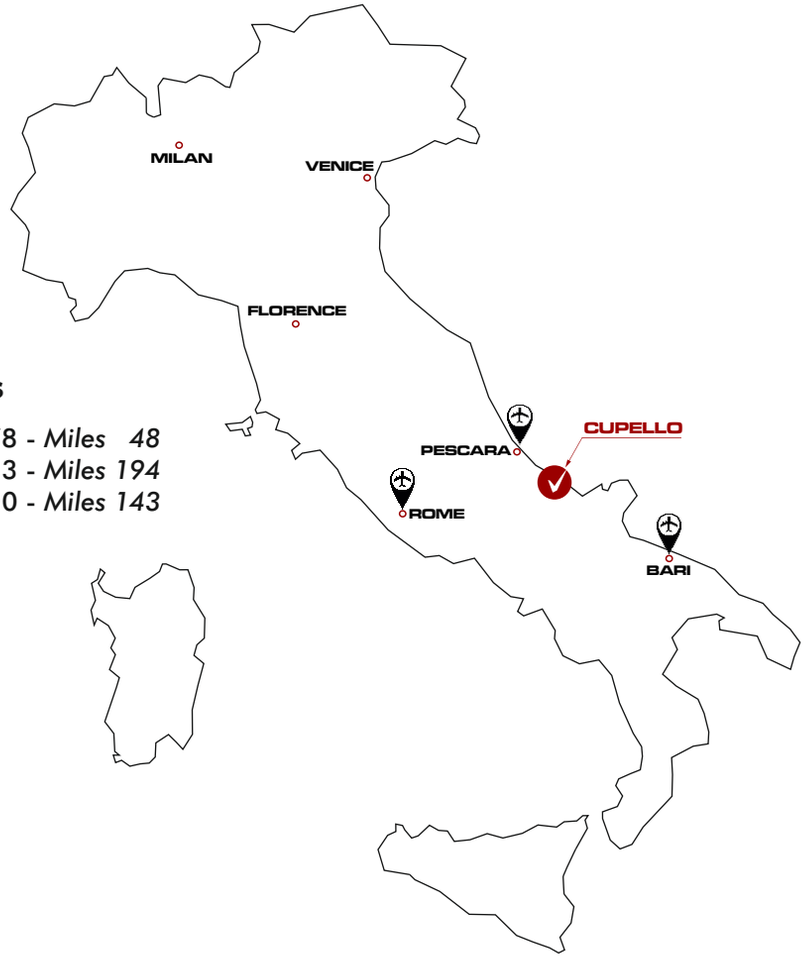
Remote Support

Our team is ready to support our Customers via modem and a dedicated VPN to access directly your PLC data. This way a real-time analysis of the situation can be performed, a way-out can be sorted, and our equipment reliability is ensured.

Highly Qualified Personnel

A team of qualified Engineers is responsible to implement and coordinate all project phases, from the feasibility study of the equipment to final installation and commissioning at Customer's site, thereby ensuring a single operational and technical interface.

Contact information



nearest airports

Pescara	(PSR)	km 78 - *Miles 48*
Roma	(FCO)-(CIA)	km 313 - *Miles 194*
Bari	(BRI)	km 230 - *Miles 143*

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