

**IOCCO**  
Glass Technologies

# Experience, tradition and passion: these values guarantee our quality

a company specialized in the technological processes of automotive glass

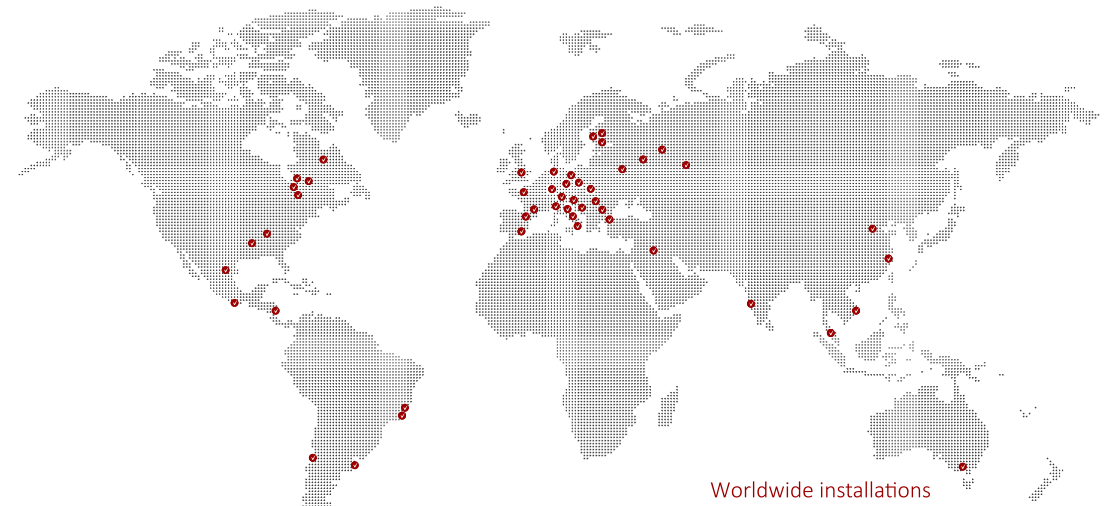


Thanks to the in-depth knowledge of main industrial glass processes gained over many years of activity, IOCCO has acquired the right experience in adopting those advanced technological processes that allowed to increase productivity by pursuing the goal of ever-increasing quality.

Besides, a cohesive team, made up of capable technicians willing to accept new challenges, has allowed the realization of important projects in the world.

The construction in Europe of the first automotive glass production plant, by applying the concept of Smart Factory solution, is the result of this capacity: IOCCO was chosen firstly as developer of the feasibility study and then as supplier of most of the industrial processes.

Said plant adopts over than 20 anthropomorphic robots installed, and same amount of artificial vision systems, as well as various machinery for specific processes.



# Equipment and lines in accordance with customers' requests.

## From feasibility study to after sales support.



We propose ourselves as PARTNER to be a support from the first feasibility study, up to the realization and start up of innovative machines and lines for industrial productions, by the following services:

- ✓ Feasibility studies
- ✓ Engineering
- ✓ Process simulation
- ✓ Software for
  - Vision systems
  - Robots
  - Plc
  - Hmi
  - Scada systems
- ✓ Construction, assembly and preliminary in house installation
- ✓ Pre-acceptance test
- ✓ Final Installation, Commissioning, Training and After sales support



✓ Feasibility studies

We propose our services from the preliminary study phase; our technicians, coordinated by the Project Managers, collaborate with the technologists of the client companies and developing solutions in line with their final expectations.

✓ Engineering

Customers have evaluated our Engineering development in terms of design and project management as our strength skills. The engineering dept. is mainly composed of senior designers with more than 10 years of experience, while junior designers are employed for the development part only. A technical manager (RTE) coordinates the activities of the project managers (PM).

✓ Process simulation

The validation phase of the project is fundamental. Thanks to the used technologies, and where requested by customers, this phase is satisfied by using virtualized simulation software, supported and simplified by Process FMEA.

✓ Software

Our technicians draw up the operating cycle of each single machine together with mechanical designers and customer processors. They proceed with the process management software by applying the industry 4.0 philosophy on PLC, Robot, Vision, man / machine interface systems (HMI) and PC based systems.

✓ Construction, assembly and preliminary installation

Special attention is paid to the construction and the consequent preliminary in house assembly.

Also the maintenance of the individual parts is taken care since the engineering phase.

The knowledge of latest production technologies is fundamental, every single detail is made with innovative machineries.

This allows to contain costs and increase the quality target.

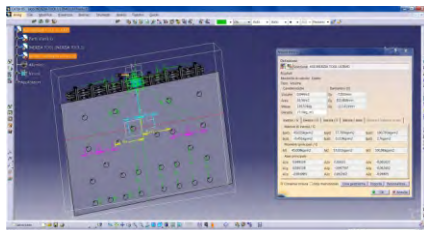
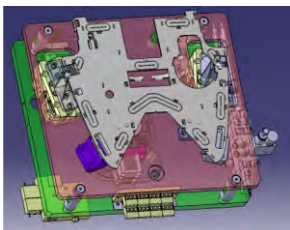
The assembly is performed by validating every single detail preliminarily

✓ Installation, commissioning, training & After sales

Installation, commissioning and training complete our offer.

The first fundamental goal for a successful project is to transfer management capacity and autonomy to client's technicians, as well as guaranteeing simple traceability and availability of materials, and last but not least responsiveness to provide the right support as soon as required.

preferred brands



# a *Competent Partner* in the automotive glass industry

Thanks to the collaboration over the years with the biggest multinational automotive glass makers, locco 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.

locco 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 plants for AUTOMOTIVE GLASS INDUSTRY

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# 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
- √ Final, inspection & packing line
- √ Value added operations "AVO"



## Pre-process line and machines

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. locco 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 locco'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.

## Final inspection & packing line

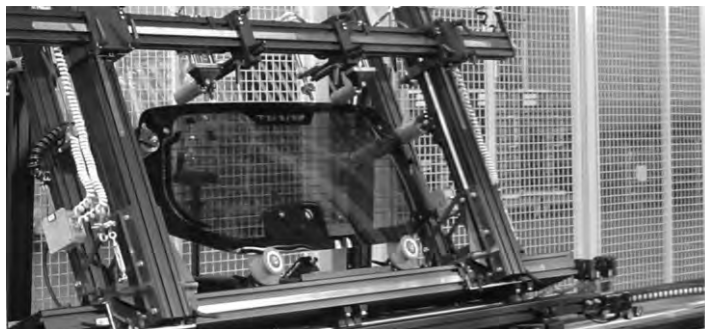
As per inspection and packing the glass, it can be unloaded either by means of pick and place robotic systems or overhead transfers. Glass is subsequently transported through a Sorting line towards the Shaping Check to guarantee the correspondence with requirements.

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.

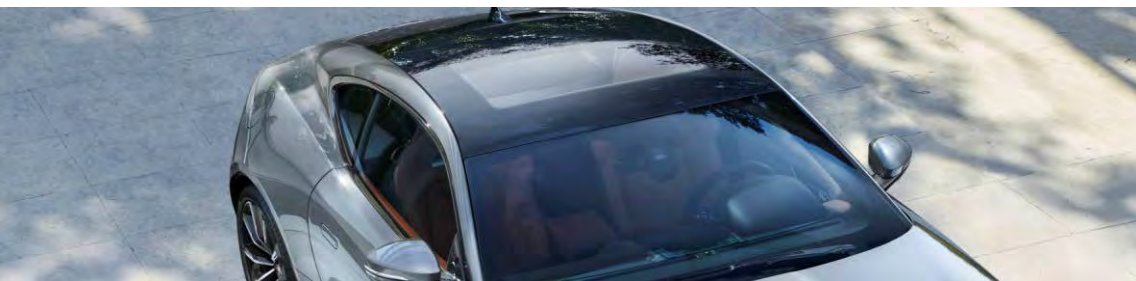
When glass is packed using paper, a dedicated machine is placed to perform the Paper Trimming and Application.

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 automotive glass



The request worldwide for laminated automotive glass significantly 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 of our Company in Laminated automotive glass provides a range of products from the single machine (such as the Vinyl unwinding machine) up to more complex lines (such as Assembly lines, bag & ring furnace for de-airing, on line application of components, Autoclave lines, PVB trimming, Inspection Lines for windshield, sunroof, sidelight, with automatic unloading and packaging system), 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 for glass inspection process.

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

## Areas of expertise

- √ pre-process line
- √ assembly process
- √ de-airing process
- √ final, inspection & packing line
- √ value added operations "AVO"





## Pre-process line and machines

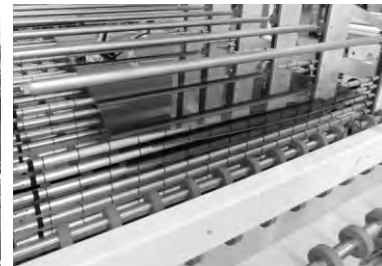
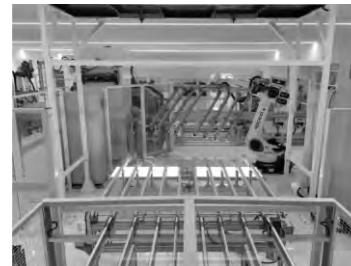
Preprocess phase consists of those activities made on glass, preliminarily to bending and consequent assembly.

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

locco 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.

It is opportune that 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, lines and machines

Shaping Check, before assembly, is a preliminary phase where glass is subject to. 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 residual water and improve drying. Once the pair of glasses is bent, the unloading system for bending furnace is performed by a dedicate 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 better adhere to glass, then it is cut, stored on trays and handled through an automatic tray feeding system to ease Assembly the PVB/Glass by the operators in the assembly room. The Assembly can be performed either automatically or semi-automatically.

The pair of glasses undergo 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.





# De-Airing system: bags and rings furnace

## a fundamental step in laminating production

The de-airing process, proposed by IOCCO in the production of automotive glass, refers to two processes that use bags or rings.

The two systems depend on the type of laminated glass to be produced.

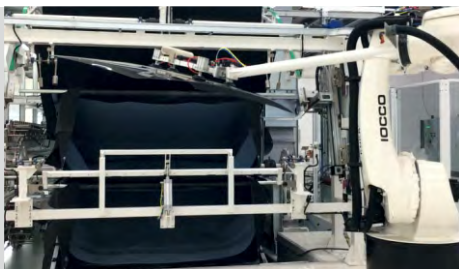
The mentioned systems adopt different technology and grade of sophistication according to the production needs, in terms of flow rate and manpower, and require significantly diverse financial commitments.

Once de-airing 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.

IOCCO offers some standard solutions on the market as well as develops customized machinery for specific processes.

These systems have been tested with laminated glass having a minimum thickness of 0.7mm as well as interlayers such as PVB-PDLC-SPD-XIR





# De-airing Box Furnace to develop Hi-Tech Windshields, Sidelites and Sunroofs

IOCCO's R&D Team recently developed and tested a new typology of de-airing furnace.

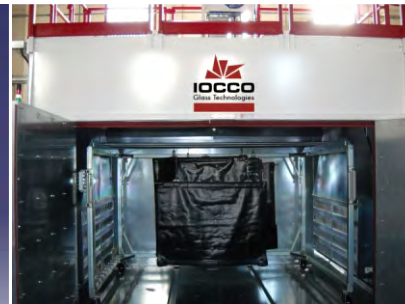
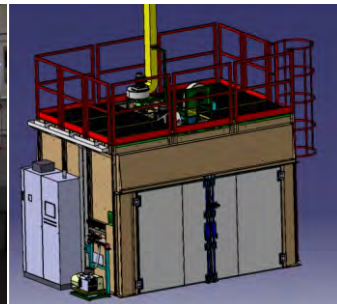
First prototype has been delivered to an international First-Tier Glass maker and in particular to its R&D Dept. to develop new technology to process different types of windshields and sidelights simultaneously.

In fact, the big flexibility of the machine allows to process in small scale various and different de-airing cycles for laminated parts by acting with continuity on vacuum levels and temperatures, the two fundamental parameters for the laminating process. The aim is to identify on the first prototypes the best process that will be then reproduced in large scale on series productions.

This is not the only one application allowed by this kind of technology: indeed the new furnace is also useful for the glass makers having small production lots or needing to change glass models repeatedly. Another possibility to use this small de-airing furnace is from the aftermarket Glass Maker (AGR) which is demonstrating particular interest for its lamination processes.

Furthermore, this technology enables the glass maker to process different types of windshields and sidelights simultaneously.

The ability to build a de-airing process tailored on the product makes this technology fundamental in the production of high-tech laminates. Another important point to highlight is the possibility to perform the de-airing cycle using the technologies of bags or rings. When equipped with proper handling and bags, this machine enables to perform a standard de-airing cycle every 25 minutes both for standard windshields from a minimum of 20 to a maximum of 30 pieces (the quantity depends on the furnace version) and for laminated sidelights, from a minimum of 60 to a maximum of 90 pieces. Actually such new technology fully satisfies the technological requirements of glass makers which expect customizable processes for each model with parameters continuously monitored. We have experienced that thanks to this process, the anomaly consisting in the comparable and continuous reduction of the PVB thickness at the edges (in terms of tenths of a millimeter) compared to the PVB thickness in the middle of the laminated glass, appears significantly reduced and the thickness reduction remains in a range of hundredths of a millimeter. This is a very important advantage because, as the car and glass makers are fully aware, said anomaly originates the phenomenon consisting in the early de-lamination of the glass edge.





# Vacuum bags furnace for windshields, sunroofs & sidelites

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

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

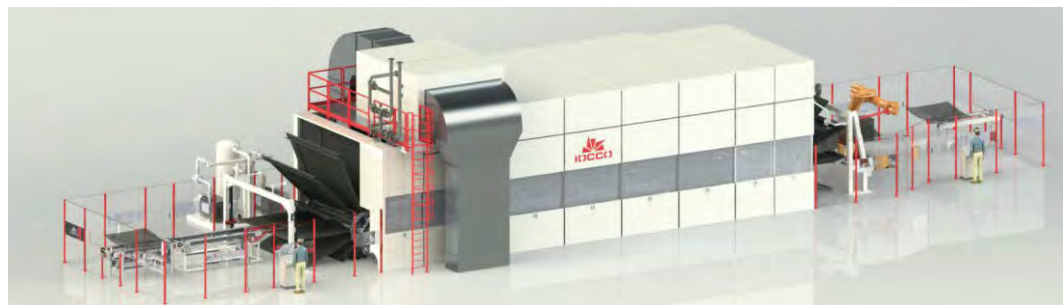
In accordance with their specific requirements and considering what biggest worldwide glass makers need, the qualified IOCCO Team performed a reengineering of the traditional vacuum bag furnace adopting deairing process to which the automotive laminated glass are subjected to.

The final goal was to define by two standard solutions for windshields and two standard solutions for sidelights, modular and highly performing.

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 IOCCO solutions allow the 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 and interlayers, even having complex and asymmetric shapes, and avoiding heavy interventions for change-overs.



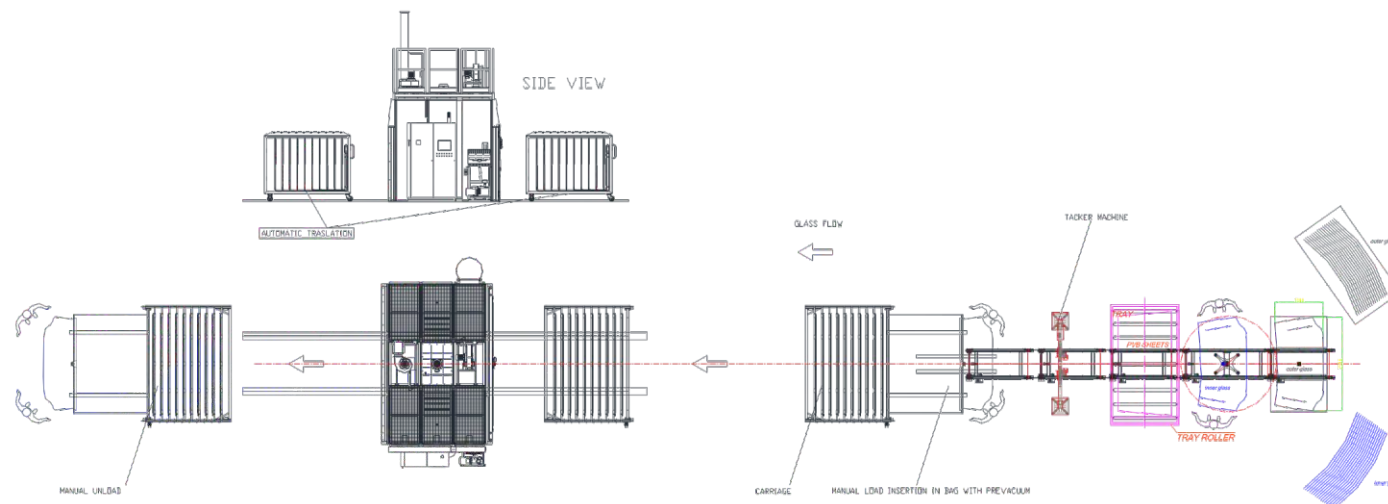


# Assembly line and De-airing Box Furnace to process AGR Windshields, Sidelites and Sunroofs

small and medium productivities, the right way for AGR market and Hi-Tech windshields and sidelites

The easier and most dynamic solution really useful for small production (like AGR market), R&D and special production.

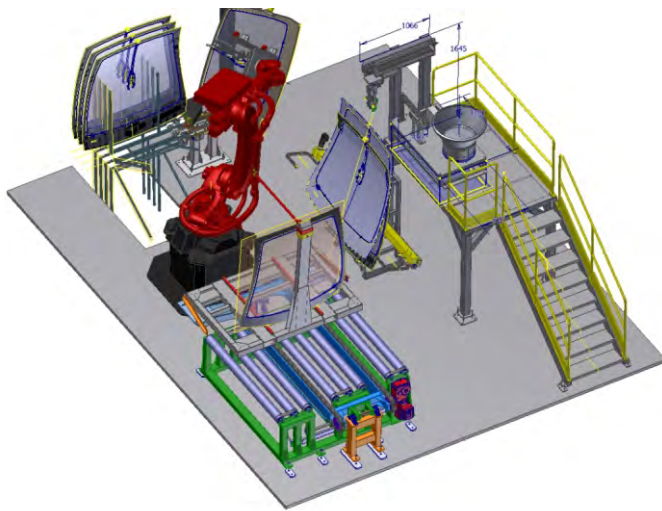
The solution below beside is suitable for batch productions methods even with different kinds and shapes of glass by avoiding any waisting time for production changeovers because the bags are adaptable and the carriage are always the same.





# Vacuum channel ring furnace for windshields

√ Robotic cell for glass unloading, ring removal, spacers application and autoclave rack loading





# Final, inspection & packing lines

At the exit of the Autoclave, laminated glass undergoes PVB trimming operation and, after final washing, it enters in the Final Inspection Line, consisting in both visual and optical checks. Iocco is able to integrate multiple optical Vision Systems.

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

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







# 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. locco 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.

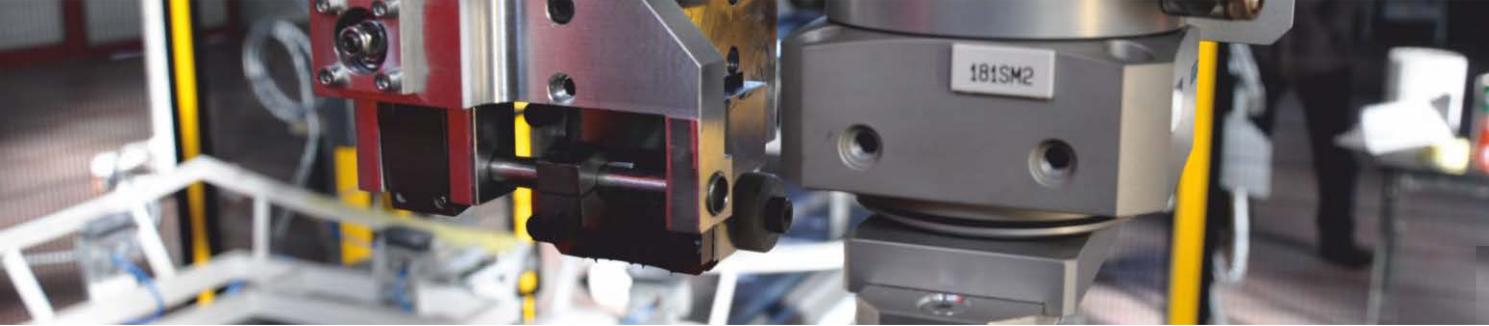
Part of these devices are placed on windscreens (rain sensors, light sensors, distance detecting cameras, etc.), others are located on either side fixed glass or backlights (for instance alarm, fax and antenna connectors), depending on the car companies. A

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 primer application can happen in manual and in robotic modes. In the first case a simple conveyor equipped with a set of vacuum cups installed on a free-rotating frame is enough. As completion, a foot pedal and a small banch for the chemicals equipped with a poka-yoka system are part of the station.

- ✓ 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)
- ✓ Manual and automatic primer application

In the second case, then in case of automatic primer application, IOCCO is able to design and build a complete robotic cell, where conveyors, centring systems, pumps and feeding systems, robots followed and controlled by vision systems and other various devices, are assembled in order to guarantee both continuity and quality of the process.

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.

- ✓ 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)

# Integration and interaction between systems, the basis for industry 4.0



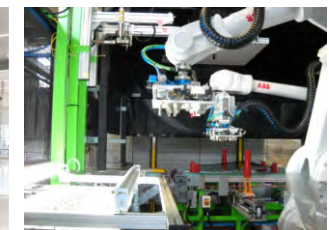
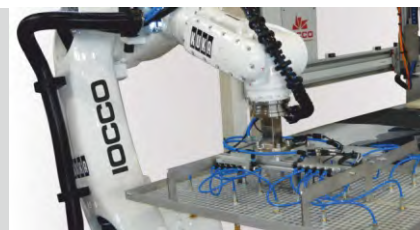
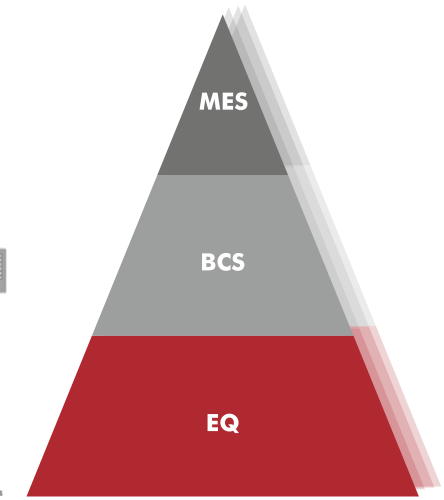
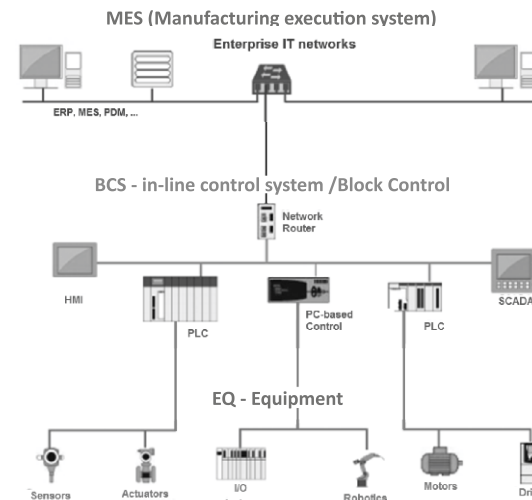
A good process control is the basis of competitiveness, both based on product quality and production capacity.

Fundamental is the understanding and managing the progress of the process data from the field.

Our TEAM has developed the ability to select and process only its own data with the continuous implementation of a structural software standard that includes all the installed devices.

Particular attention is paid to continuous information and training on the new systems offered by the market both in terms of sensors and actuators and PLC, Robot, Vision, human / machine interface (HMI) and PC-based systems.

The strength of IOCCO is the ability to integrate complex systems.





# Production continuity, capacity, quality and competitiveness over time are the secrets of our customers

## AFTER SALES SUPPORT

IOCCO also follows the customer starting from the end of the supply by offering qualified after-sales services, indispensable especially in the early stages while using the more complex installations in which operators need to master the system.

IOCCO can provide constant monitoring and a remote assistance service, with immediate interventions via VPN connection for rapid diagnosis and resolution of the problems.

## TRAINING

IOCCO provide trainings to customers' staff in order to complete all phase of testing.

This phase is carried out directly by our specialists and customized with the aim of making customer staff as independent as possible not only in the management of the system but also in the diagnostic capacity the recovery of any anomalies.

### After-Sales Service

- Spare parts supply
- Theoretical and practical professional training
- Remote assistance in a customized solution
- Preventive, ordinary and extraordinary maintenance
- System upgrade

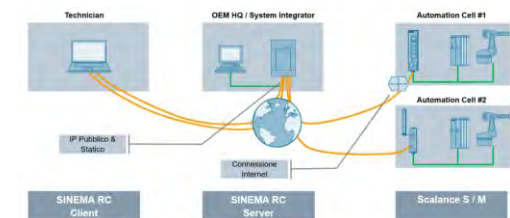
**KUKA**

Official System  
Partner

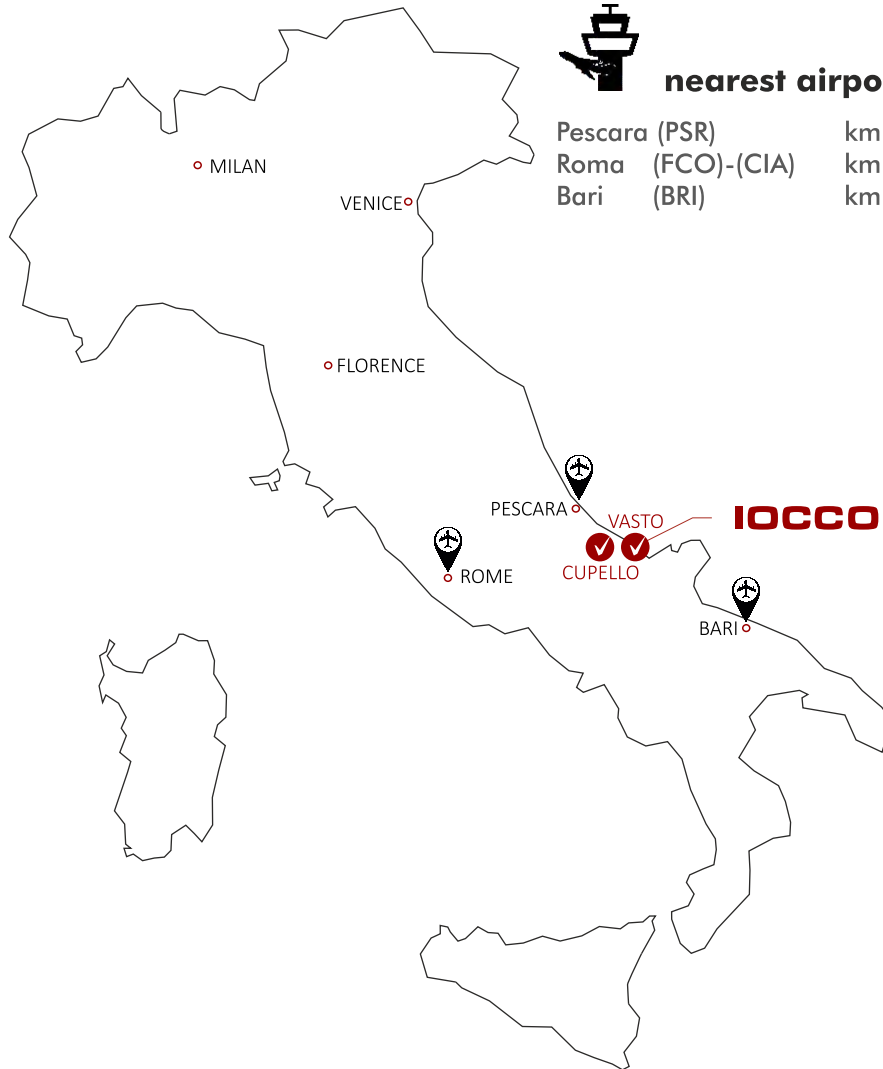
### preferential remote connection:

**SIEMENS**

**SINEMA Remote Connect**



# Our contacts



## nearest airports

Pescara (PSR)	km 78 - Miles 39
Roma (FCO)-(CIA)	km 293 - Miles 182
Bari (BRI)	km 242 - Miles 150

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