# MA STER SERIES

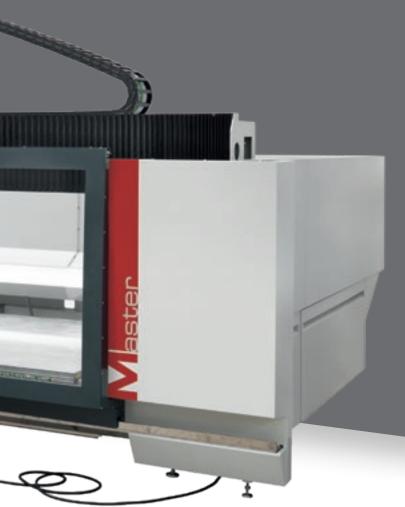
### CNC MACHINING CENTRE FOR GLASS



## LATEST-GENERATION TECHNOLOGY



The **Master Series** is the range of Made in Biesse work centres 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. The all-new and improved Master range maintains the quality and reliability that has always characterised Biesse technology, making it an industry-leading company and an iconic point of reference in its field.



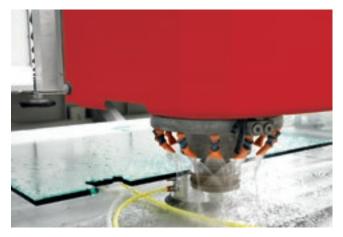
# **MASTER** SERIES

- <sup>r</sup> UNPRECEDENTED QUALITY AND FINISH
- FLEXIBILITY AND VERSATILITY IN ALL MACHINING OPERATIONS, GUARANTEEING UNEQUALLED PRODUCTIVITY
- SUPERB PERFORMANCE EVEN WHEN CARRYING OUT THE MOST COMPLEX MACHINING OPERATIONS
- F HELIX INTEGRATED BORING SYSTEM: EXCLUSIVE INTERMACTECHNOLOGY.
- REDUCED TOOLING TIMES
- FUNCTIONAL DESIGN AND ERGONOMIC PROTECTION FOR OPTIMUM VISIBILITY AND MAXIMUM SAFETY DURING MACHINING
- F EXCELLENT PRODUCTION EFFICIENCY THANKS TO THE PERFECT INTEGRATION WITH ROBOTS FOR THE PRODUCTION OF LARGE BATCHES

## UNPRECEDENTED QUALITY AND FINISH

The Master Series is able to perform the most complex and diverse machining operations, ensuring the very finest finish quality on large sheets of structural glass, unique design objects or small glass products for the world of lighting.





Milling.

Peripheral grinding of the cutting edge.



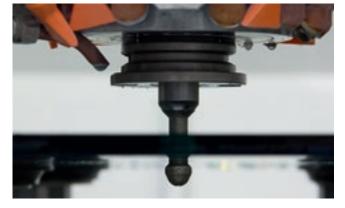
3 AXIS MACHINING GUARANTEES MAXIMUM RELIABILITY AND ACCURACY FOR THE PRODUCTION OF BATHROOM UNIT TOPS, SHOWER ENCLOSURES AND GLASS FOR DOMESTIC APPLIANCES. The Master Series is the best solution for overcoming new challenges and boosting competitiveness, enabling companies to excel in high-speed machining of small and large production batches.



High-speed grinding.



Grinding of ultra thin glass.



Boring integrated with the Helix system.



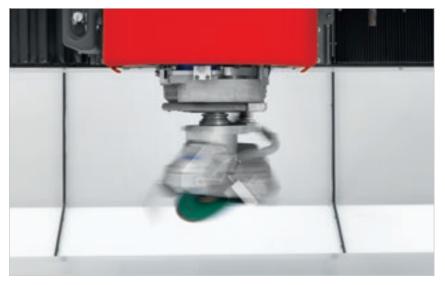
Boring from above.



Surface writing.

## MAXIMUM FLEXIBILITY

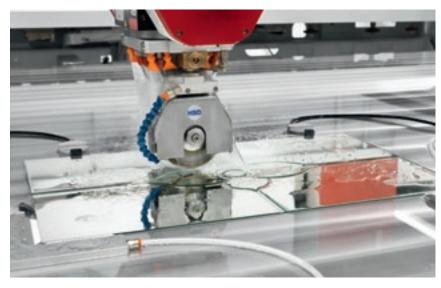
The addition of the infinite rotary **C Axis** on **3-axis** configurations of the machine enables perfect execution of machining operations, with fluidity and precision.





C axis.

Cup grinding with aggregate.



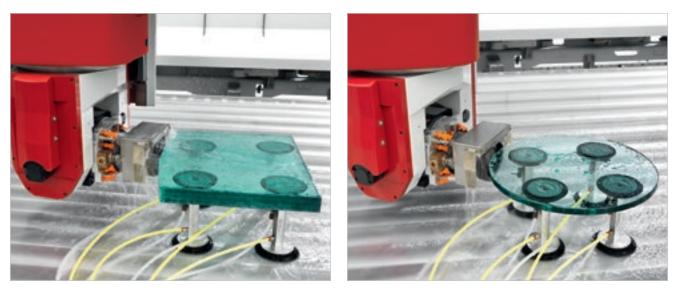


Boring from below.

Scoring.

### **ENDLESS POSSIBILITIES**

The solid high-tech 5-axis working head with **INFINITE C axis** and the -90 ° to +90 ° **tilting A** axis enable all machining operations to be completed perfectly, with the renowned quality offered by Biesse work centres.



Cup grinding of shaped float and layered glass,

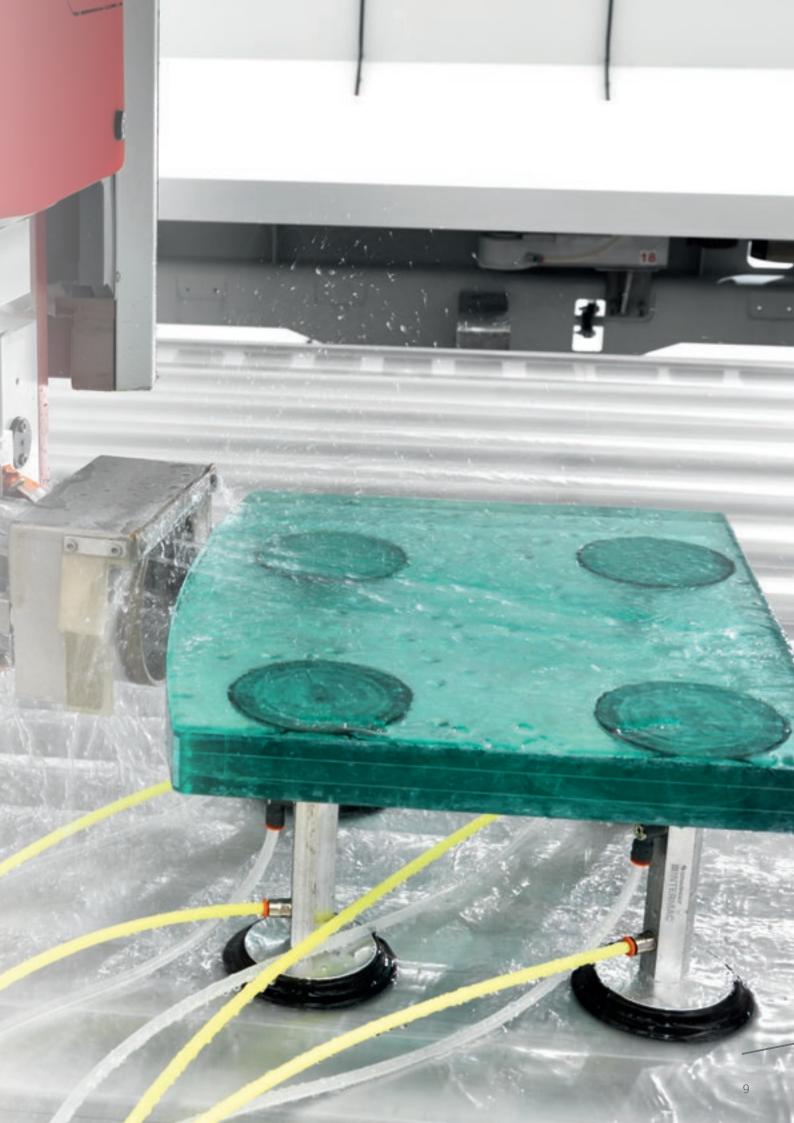


Shaped bevel.

### **5-AXIS TECHNOLOGY**

### High-level technology for the best results with maximum ease of use.

The 5-axis head with endless rotation C axis and tilting A axis (from -90° to +90°) ensures excellent flexibility and pushes the limit for the execution of complex machining operations.



# **REVOLUTIONARY BORING**

Helix is the Diamut tool that, when combined with Biesse software, exceeds all the limits of the traditional boring systems, using one single tool for all the boring, grinding and countersinking operations on glass sheets of up to 19 mm.



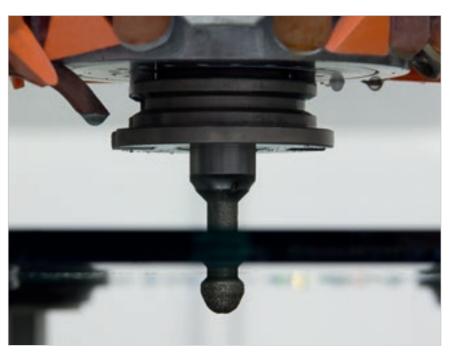
The new standard for boring operations.

Helix System was born of the desire to develop a revolutionary boring system unlike anything that has been seen on the market to date, capable of drilling holes with integrated upper and lower countersink on glass sheets up to 19mm thick, using a single tool on CNC machines.

### **DEVELOPED, PATENTED QUALITY**

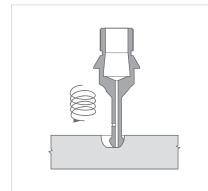
Innovation created by a team of Diamut and Biesse experts, Helix System is the perfect blend of hardware and software that emerges in the whole range of Master processing centres.

### **INTEGRATED BORING SYSTEM**

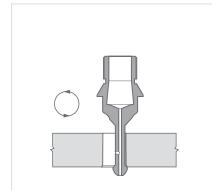


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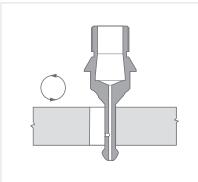
An innovative tool, managed by specific software.



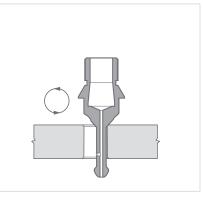
1\_Boring with helical movement



3\_Lower countersinking



2\_Lateral grinding



4\_Upper countersinking

#### $\swarrow$

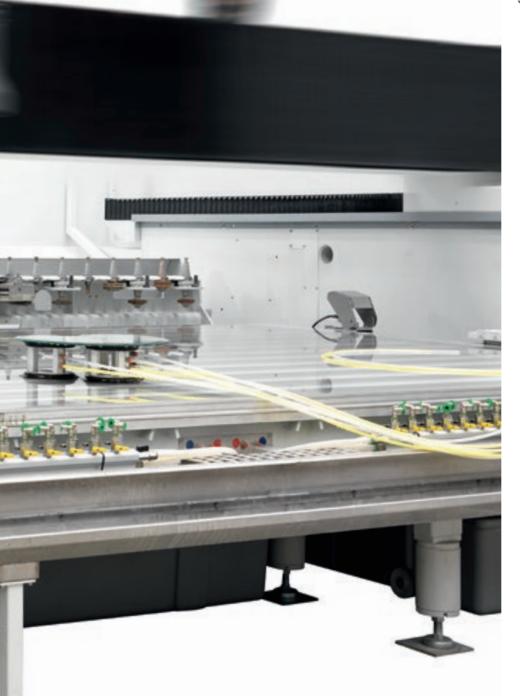
- Maximum finish quality
- Machining tolerances are halved
- Holes with different diameters using just one tool
- Can also be used on laminated glass
  Integrated upper and lower
- countersinking
- Machining operations on any part of the sheet.

# **SUPERB PERFORMANCE**



Maximum acceleration and axle speeds, minimising waiting times and enabling cycle times to be reduced.

The Master range guarantees fantastic performance thanks to the possibility of machining one or two glass sheets at the same time.



# MAXIMUM MACHINING RELIABILITY AND PRECISION



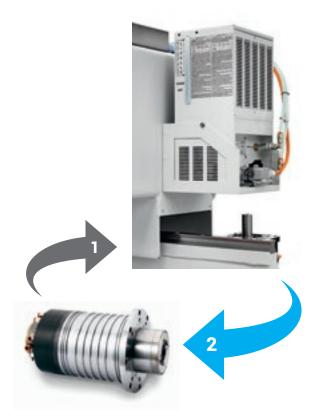
The Master range is fitted with spindles manufactured by HSD - a world leader in its sector. They guarantee optimum power, compact dimensions and extremely high finishing standards.

#### +60% spindle lifespan and noise reduction

thanks to 4 ceramic bearings that offer greater resistance to mechanical stress.

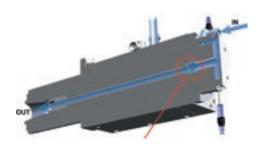
#### Greater reliability

thanks to the use of stainless steel and the 55mm spindle shaft.



**Glycol-based cooling** systems with a closed circuit that guarantees constant results over time and resistance to the maximum machining stress levels.

- 1. High-temperature fluid
- (cooling system with heat exchanger).
- 2. Low-temperature fluid



DPC (patented) - Controlled loss distributor

A patented system that ensures excellent reliability and a long lifespan, thanks to the innovative seal system with no mechanical contact.

### **MASTER** SERIES



#### $\swarrow$

Spindle absorption is constantly measured by the NC, and the pressure exerted by the tool on the piece is then proportionally adjusted to guarantee the best possible finish quality.



The entire Master range is equipped with an integrated system for the automatic greasing of the movement axes, ensuring constant and precise maintenance every day.

## CUSTOMISABLE ACCORDING TO REQUIREMENTS



The size of the work table is optimised for all production requirements.



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The height of the work table (730 mm, with optional 525 mm version available) simplifies loading and unloading of panels in line with requirements, to facilitate the handling of large sheets.



Master 45.5 processing centres can also be configured in the Plus version for companies that need to machine particularly thick pieces.

# WIDERANGEOFTOOLS READY TO USE ON THE MACHINE

The Master Series offers the option of equipping the machine with a large number of ready-to-use tools for any type of machining operation, with automatic loading via the working unit.



Rear single row magazine.

Rear dual row magazine.



**Tool change up to 10 seconds** The fastest solution in the world of glass, thanks to the 8-position revolver magazine on the head.

Rotary tool magazine on which the tools can be safely loaded even while the machine is working.

#### THE REAR MAGAZINE GUARANTEES A WIDE SELECTION OF TOOLS AVAILABLE IN THE MACHINE, READY TO CARRY OUT NUMEROUS MACHINING OPERATIONS.

#### MAXIMUM RESULTS THANKS TO THE ABILITY TO EQUIP THE MACHINE WITH HIGH QUALITY COMPONENTS.



The mechanical pre-setter checks the degree of wear on the diamond tools (with a frequency set by the machine operator) and automatically updates the tool parameters in the machine control system, thereby guaranteeing consistent machining results over time and preventing potential errors.

The dressing devices are positioned near the working area for fast, easy tool dressing operations that guarantee constant top quality and speedy execution. The dressers make the Master fully automatic, even for the longest machining operations, which means that manual operations are also simplified.



Finishing wheel dressing.





Diamond wheel dressing.

#### Drill dressing

The dressing device is placed near the working area for the immediate dressing of tools, to guarantee the best quality and quickest execution all the time.

## **REDUCED TOOLING AND SET-UP TIMES**



The operator saves 20% of the time traditionally needed for preparing the work table using standard methods, thanks to the cutting-edge laser devices.

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The cross-hairs laser guides the operator through the positioning of suction cups and stops, speeding up the preparation of the work surface.



The laser projector is used to made the preparation of the working area quick and easy, reproducing the position of all the suction cups and pieces to be machined on the table and preventing head movements. The on-board laser device allows the panel to be placed on the work table without having to use mechanical stops, ensuring maximum precision with significant time savings. Particularly useful in the presence of large sheets that are heavy and occupy the entire work table.



Head with 3 axes.

 $\checkmark$ 



Head with 5 axes.

 $\swarrow$ 

# EASE OF USE

### Extremely easy to use, thanks to the ergonomic console and user-friendly operator interface.

The use of a PC with Windows guarantees a particularly easy, user-friendly approach for the operator and allows for CAD-CAM programming directly beside the machine.

Console with mobile arm for improved organisation and management of work.

The user interface in a Windows environment allows the operator to:

- easily set the work list to optimise production
- rapidly handle the work origins and tool parameters
- see the execution time for each piece.



Optimum convenience in the operations thanks to a hand-held terminal with:

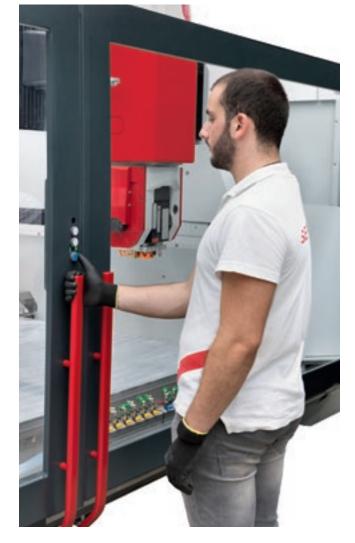
- quick, simple positioning of the stops and suction cups thanks to the option of tooling the work table with doors open;
- simplified tool preparation, thanks to the optimum control of the working head directly on the piece to be machined.
   No limits between operator and Master;
- machining speed control;

ERMAC

- emergency button always near the operator's
- hand;
- start buttons for the two machining stations;
- machining pause and restart button.

### PROTECTION AND SAFETY FOR ALL MACHINING OPERATIONS

Biesse has always paid the utmost attention to the health and safety of its customers. The protection of every operator during the use of the machine is of vital importance, preventing any possible distraction or error that could lead to inconvenience or even accidents.



One indispensable condition for obtaining any sort of financing is the respect of the machinery directives and workplace health and safety regulations.

With Master working centres, the operator is protected by:

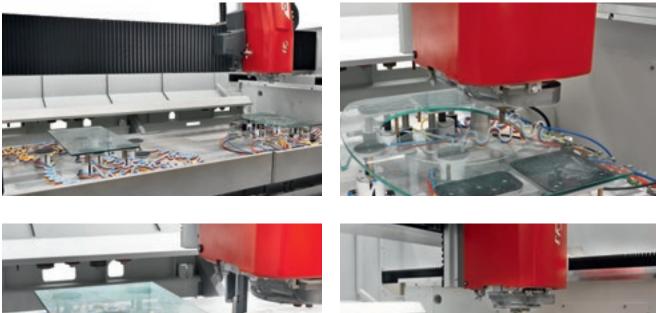
- Active safety features in the front protection devices and rotation magazine.
- Ergonomic front guards of a suitable height that are also explosion-proof (certified by external bodies with "detonation" tests).
- Side and rear guards made of a metallic material subjected to special anti-corrosion painting cycles.
- Electric and pneumatic systems fully integrated in the machine and protected by closed doors.
- Inaccessibility of moving machine parts.
- A clean working environment (water and machining residues are not dispersed).
- Reduced noise levels, fully complying with the machinery directive.

The Master series is equipped with ergonomic protection devices that enable better visibility of the machining operation during the process.

## MAXIMISED PRODUCTIVITY

#### MASTER WITH INNOVATIVE MTS SYSTEM -MATRIX TELESCOPIC SYSTEM

The MTS system can process various types of glass sheets of different shapes and sizes as part of a Batch One production process, with no need to worry about changing the positioning of the suction cups in the machine each time, thus enabling different sheets to be machined in succession.





#### ADAPTS TO THE WHOLE MASTER LINE\*

With MTS, the work table can be configured with up to 40 suction cups of differing sizes and shapes. MTS systems are automatically managed by the PLC machine software, and can be programmed using the specific CAM functionalities.

There are 3 possible configurations:

- 20 telescopic suction cups (basic configuration)
- 30 telescopic suction cups (optional)
- 40 telescopic suction cups (optional)

Both telescopic and standard suction cups can be fitted on the work table simultaneously.

\*except Plus versions

#### **MASTER** SERIES

### **FACILITATED OPERATIONS**

#### Smart scheduling



#### CENTRING SYSTEM WITH AUTOMATIC SETTING

The CAM functions developed make it easier for the operator to position the piece in relation to the telescopic suction cup matrix, using different colours to indicate the suction cup status.

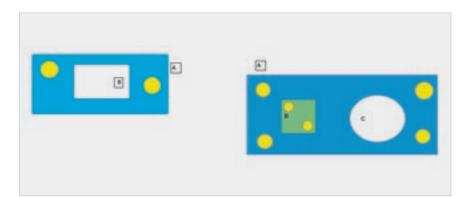
- $\checkmark$  suction cup active (green  $\bullet$ )
- ✓ suction cup active for waste (purple ●)
- suction cup disabled (grey •)





#### WASTE MANAGEMENT

During the machining operation, the waste material is managed automatically. This means the next machining task can be started without the operator's intervention as the waste is automatically unloaded

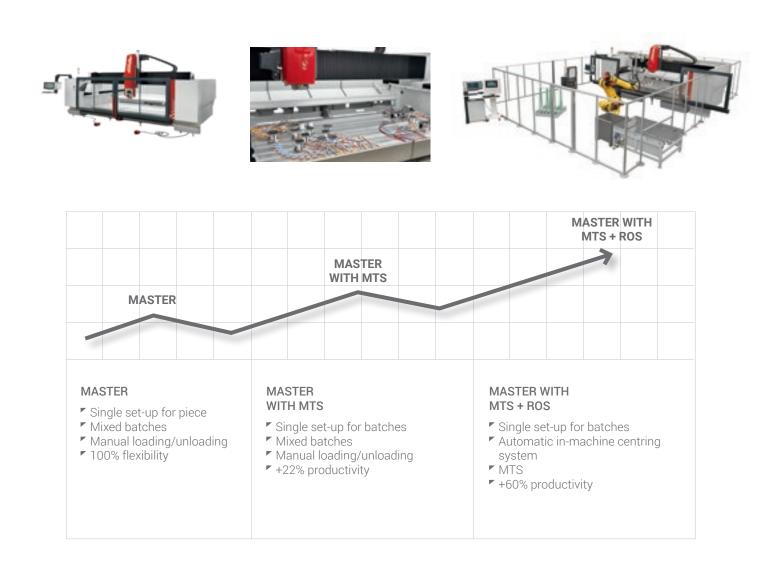


#### **PIECE - TRACKER**

The piece-tracker system identifies piece rototranslation automatically. The stops are not therefore needed, and the telescopic suction cup matrix is used to centre the piece to be machined.

# THE HORIZONTAL EVOLUTION

The benefits of Master solutions



### EFFICIENT PRODUCTION, WITH NO LIMITS

Master can be perfectly integrated in a line with robots and loading/unloading systems. It's the ideal solution for those who need automated solutions for producing large batches (the household appliance field and the automotive, electronic and furnishing sectors).

Master increases productivity 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)





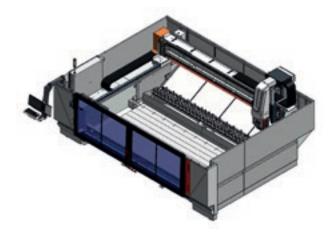
### **INDUSTRY 4.0 READY**

Industry 4.0 is the latest industry frontier, based on digital technologies and machines that speak to the companies. The products can be interconnected with the production processes via smart networks.

Biesse's commitment is to transform our customers' factories with real-time technology, ready to guarantee digital manufacturing opportunities, with smart machines and software packages becoming vital tools that facilitate the daily tasks of people all over the world processing glass, stone, metal and more. Our philosophy is a practical one: to supply entrepreneurs with solid data that can help them to lower their costs, optimise their processes and improve their results.

And that means being 4.0 ready.

### TECHNICAL SPECIFICATIONS



<b>OVERALL DIMENSIONS</b>		Master 33.x	Master 38.x	Master 45.x	Master 45.5 Plus
Overall machine dimensions LxWxH MAX	mm	3490x6250x2805	3895x6750x2805	4420x7455x2805	4420x7455x3380
Overall machine dimensions LxWxH max equipped with side tool magazine	mm	3490x6510x2805	3895x7010x2805	4420x7715x2805	4420x7715x3380
Overall machine dimensions LxWxH max equi- pped with rear tool magazine single raw	mm	3895x6250x2805	4945x6750x2805	5470x7455x2805	5470x7455x3380
Overall machine dimensions LxWxH max equipped with rear tool magazine double raw	mm	4525x6250x2805	4945x6750x2805	5470x7455x2805	5470x7455x3380

(L=length W=width H=height) - Overall dimensions are intended with closed doors, without considering the hanging control panel (front, side tool magazine, electrical control cabinet). L + 1000 mm considering maximum dimension of hanging control panel.

MASTER - 3 AXIS		Master 33.3	Master 38.3	Master 45.3
Maximum machinable piece size (3-axis grinding with tool of diameter 100mm)	mm	3,300 x 1,600 *	3,800 x 2,000 *	4,500 x 2,500 *
Z axis stroke	mm	465	465	465
C axis stroke (optional)		00	00	$\infty$
Max axis speed (X, Y, Z)	m/min	60, 70, 18	60, 70, 18	60, 70, 18
Work table height ("high table" version)	mm	740 (525)	740 (525)	740 (525)
Electrospindle power In S1 (S6)	kW	15 (18)	15 (18)	15 (18)
Max electrospindle rotation	rpm	12000	12000	12000
Tool coupling		ISO 40	ISO 40	ISO 40
Tool magazine for	up to	53	61	69
Power required	kW / HP	25/34	25/34	25/34

\* Depending on the configuration of the tool magazine.

MASTER 5 AXIS		Master 33.5	Master 38.5	Master 45.5
Maximum machinable piece size (3-axis grinding with tool of diameter 100mm)	mm	3,300 x 1,550 *	3,800 x 2,000 *	4,500 x 2,500 *
Z axis stroke	mm	465	465	465
C axis stroke (optional)		00	00	00
Maximum axis speed (X, Y, Z)	m/min	60, 70, 18	60, 70, 18	60, 70, 18
Work table height ("high table" version)	mm	740 (525)	740 (525)	740 (525)
Electrospindle power In S1 (S6)	kW	15 (18)	15 (18)	15 (18)
Max electrospindle rotation	rpm	12000	12000	12000
Tool coupling		ISO 40	ISO 40	ISO 40
Tool magazine for	up to	53	61	69
Power required	kW / HP	25/34	25/34	25/34

\* Depending on the configuration of the tool magazine.

#### **MASTER (5 AXES) PLUS**

#### Master 45.5 Plus

Maximum machinable piece size (3-axis grinding with a tool with a diameter of 100 mm)	mm	4,500 x 2,500 *
Z axis stroke	mm	650
C axis stroke (optional)		00
Max axis speed (X, Y, Z)	m/min	60, 70, 18
Work table height ("high table" version)	mm	740 (525)
Electrospindle power In S1 (S6)	kW	15 (18)
Max electrospindle rotation	rpm	12000
Tool coupling		ISO 40
Tool magazine for	up to	69
Power required	kW / HP	25/34

\* Depending on the configuration of the tool magazine.

The technical specifications and drawings are non-binding. Some photos may show machines equipped with optional features. Biesse Spa reserves the right to carry out modifications without prior notice.

Weighted sound pressure level A (LpA) during machining at the operator's workstation on the vane-pump machine Lpa=79dB(A) Lwa=96dB(A) Weighted sound-pressure level A (LpA) at the operator's workstation and sound power level (LwA) during machining on the cam-pump machine Lwa=83dB(A) Lwa=100d-B(A) Measurement uncertainty K dB(A) 4.

The measurement was carried out in compliance with UNI EN 848-3:2007, UNI EN ISO 3746: 2009 (sound power) and UNI EN ISO 11202: 2009 (sound pressure levels at workstation) during panel machining. The noise levels shown are emission levels and do not necessarily correspond to safe operation levels. Despite the fact that there is a relationship between emission and exposure levels, this may not be used in a reliable manner to establish whether further measures need to be taken. The factors determining the exposure level for the workforce include length of exposure, work environment characteristics, other sources of dust and noise, etc. i.e. the number of other adjoining machines and processes. At any rate, the above information will enable the operator to better evaluate dangers and risks.

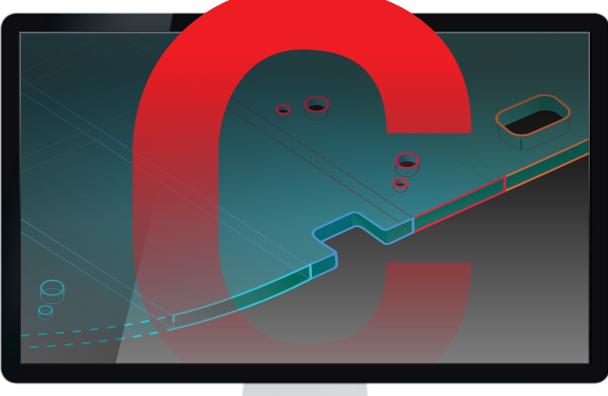
### IC: THE TOTAL GLASS EXPERIENCE IN A SINGLE SOFTWARE PACKAGE



IC WAS CREATED FROM THE EXPERIENCE AND RELIABILITY OF ICAM WHICH, WITH OVER 7500 PACKAGES INSTALLED IN 180 COUNTRIES, IS THE MOST WIDELY USED CAD/CAM SOFTWARE IN THE WORLD WHEN IT COMES TO GLASS APPLICATIONS.

- RENEWEDGRAPHICINTERFACETHAT'SUSER-FRIENDLYANDEASY TOPICKUPTHANKSTOSELF-LEARNINGCONCEPTS, BUTWITHOUT COMPROMISES IN TERMS OF FUNCTIONS AND PROGRAMMING FLEXIBILITY
- **r** ROBUST, RELIABLE PLATFORM
- F ENHANCED CALCULATION POWER THANKS TO THE USE OF THE LATEST DEVELOPMENT TECHNOLOGIES
- **MODERN INTERFACE:** similar to the most modern apps, it can be used with a touch screen.
- EXTREMELY USER-FRIENDLY: assisted design in 5 steps. From the drawing to the machine in just a few seconds.
- **\*** TOTALCONTROLOFTHEDESIGNPROCESS, FROMTHEDRAWINGTOTHEFINISHEDPIECE.
- SOLUTIONS FOR LARGE-SCALE OR ONE-BATCH PRODUCTION: the possibility to manage libraries of models (even parametric).
- SUPPORT SERVICE ALONGSIDE THE CUSTOMER: IC is equipped with "AIC Log" technology: in the event of problems and/or a need for support, Biesse Service can see the operations that have been carried out, and can quickly intervene.



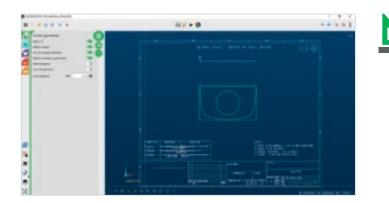




## IC: SEE, DESIGN, CREATE

The software suggests the correct sequence of the 5 steps for the design phases.

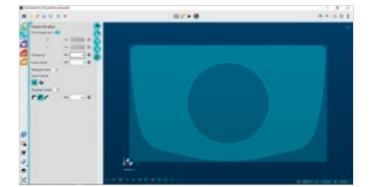
- 1. SIMPLIFY
- 2. IDENTIFY
- 3. APPLY
- 4. PROCESS
- 5. EXECUTE





#### SIMPLIFY

In this step, an imported drawing can be simplified, the geometries needed for the machining operation can be identified, and any possible imperfections can be corrected.





#### IDENTIFY

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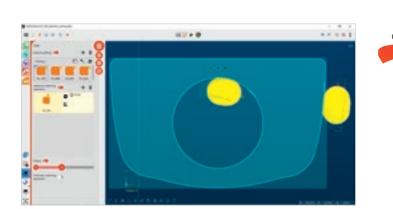
The glass to be worked in the machine is easily identified, starting from the drawing previously processed or specifying its dimensions.





#### APPLY

With a simple drag&drop, additional elements such as notches or hardware items can be parametrically applied to the piece. These elements can be easily added and personalised by the customer.





#### PROCESS

The geometries are automatically processed with a click: circles become bored holes, profiles become milling operations, glass is ground; layers can be associated with specific machining operations.

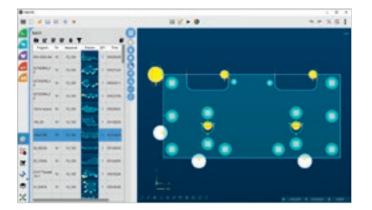




#### EXECUTE

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The piece is prepared so it's ready to be executed in the machine. The carriage positions are calculated and the necessary suction cups are enabled. Possibility to intervene manually for collision control.





Option of importing and automatically programming a list of designs (in standard DXF, DWG or IC formats) and sending them directly to the machine. Option of modifying the pieces after the automatic calculation.

IC AUTOMATICALLY SIMPLIFIES COMPLEX DRAWINGS, IDENTIFYING THE GLASS TO BE MACHINED AND ALL THE OPERATIONS REQUIRED TO PRODUCE IT.

# CUSTOMER CARE IS WHO WE ARE

SERVICES is a new experience for our customers, to offer not just excellent technology but the added value of an increasingly direct connection with the company, the professionals who work there and the experience they embody.



#### ADVANCED DIAGNOSTICS

Digital channels for remote interaction online 24/7. Always ready to intervene on-site seven days a week.



#### A WORLDWIDE NETWORK

39 branch offices, over 300 certified agents, retailers in 120 countries, and spare parts warehouses in America, Europe and the Far East.



#### SPARE PARTS AVAILABLE IMMEDIATELY

Identification, shipping and delivery of spare parts for every need.



#### **EVOLVED TRAINING OPPORTUNITIES**

Lots of on-site, online and classroom training modules for personalised growth.

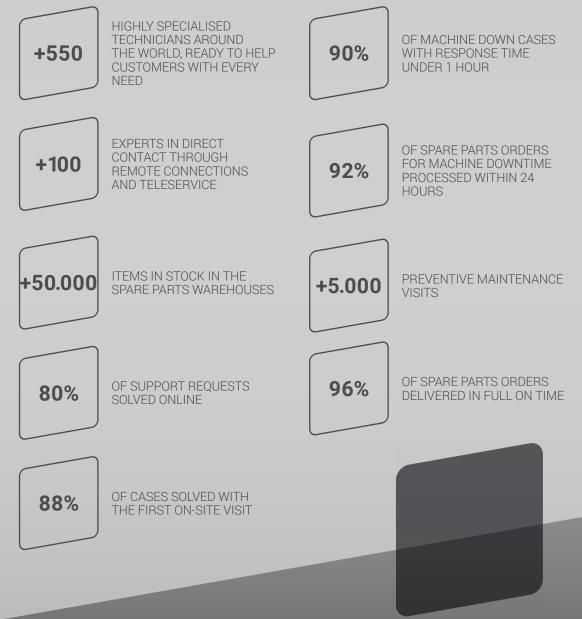


#### VALUABLE SERVICES

A wide range of services and software packages to help our customers achieve continuous improvements in performance.

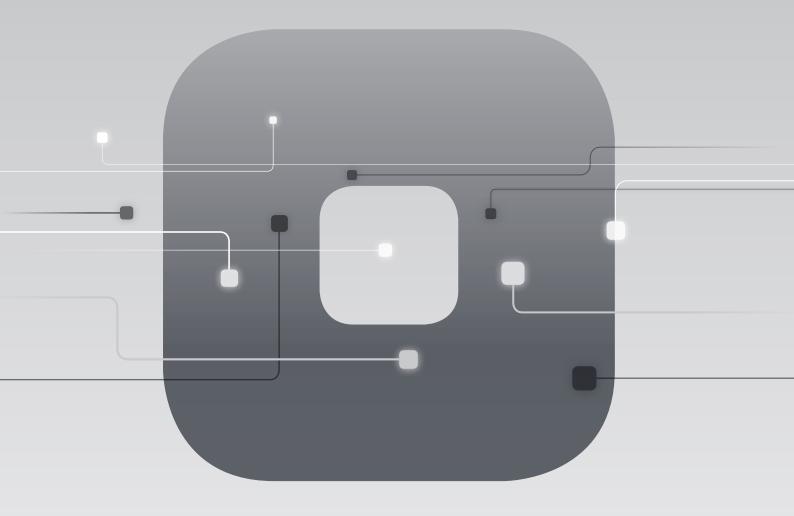
#### **SERVICES**







#### **GREATER VALUE FROM MACHINES**



The Biesse IoT platform which enables customers to access an extensive range of services to streamline and rationalise their work management processes.

○ SERVICES ○ PROACTIVITY ○ ANALYSIS



# MADE WITH BIESSE

### GLASS ART AND CUTTING-EDGE TECHNOLOGY

"In Fiam's workshops, we have always tried to respond to designer ideas, even when they were apparently impossible to implement. Designers, like artists, have a creativity that stimulates cutting-edge innovation. So, over time, we have been able to develop new technologies that have allowed us to create unique objects on an industrial scale".

"Everything started with a stool. A glass stool, of course. A photographer friend came to see me in my glass workshop, saw me standing on the stool and took a picture that was published in some newspapers. That's when I thought: why not try to make furniture with this material?

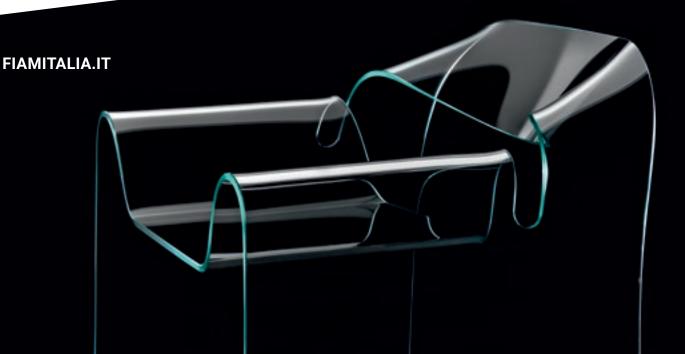
From the first, self-built oven to bend glass sheets through to the first collaborations with artists and designers, it's been an ongoing learning curve.

Along with design innovation, Fiam has always invested in technological innovation too. In this respect, the partnership with Intermac for the development of solutions such as double-edging grinding machines and the Master processing centres range is a strategic one.

Our company has always worked in

partnership with internationally-renowned Italian and foreign designers. People like Massimo Morozzi, Rodolfo Dordoni, Giorgetto Giugiaro, Enzo Mari, Cini Boeri through to Vico Magistretti, Ron Arad, Makio Hasuike. Not forgetting Philippe Starck, Daniel Libeskind and Massimiliano Fuksas".

Vittorio Livi, founder and sole director Fiam Italia, Italy



Founded in Italy, international native.

# We simplify yo manufacturing to make the po of any materia



We are an international company that manufactures integrated lines and machines to process wood, glass, stone, plastic and composite materials and what will come next.

Thanks to our rooted competence nurtured by an ever-growing worldwide network, we support your business evolution – empowering your imagination.

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