



*your
technology
partner*



LOKARI
LEO LAINE OY

Efficiency and automation in vacuum forming

21/03/2019



GROUP IN FIGURES ARE STRONG AND RELIABLE



€ 700 million
in consolidated
turnover



4,000 people
in Italy
and abroad



3 main
production
centres



A presence on
5 continents
that is direct
and widespread



7% of turnover
invested in R&D

WIDESPREAD PRESENCE THROUGHOUT THE WORLD





INDUSTRIAL MACHINERY

Stand alone machines, integrated systems and services dedicated to the processing of a wide range of materials.



Woodworking technologies



Technologies for advanced materials, plastic, stone, glass and metals processing

INDUSTRIAL PARTS

Technological components for Group and third party machines and plants and for the mechanical industry



Electro-spindles and technological components



Electrical panels



Metalworking and mechanical machining



Cast Iron



A CUTTING-EDGE PARTNER

CMS SpA manufactures CNC machines and systems for processing

- composite materials
- carbon fibre
- aluminium & light alloys
- plastic
- glass
- stone
- metal

Established in **1969** with the aim of offering **customized and state-of-the-art** solutions, based on the in-depth understanding of the **customer's production needs**.

Significant **technological innovations**, originating from substantial investments in **research and development** and acquisition of **premium companies**, have enabled constant growth in the various sectors of reference.





CMS KEY NUMBERS

EXPERIENCE
50 YEARS

RELIABILITY
100%
MADE IN ITALY

STRENGTH
140 MLN/€
TURNOVER

TEAM
800
EMPLOYEES

KNOWLEDGE
9.200+
MACHINES INSTALLED


a company of 

TECHNOLOGY
58
PATENTS

WIDESPREAD
124
COUNTRIES SUPPLIED



ALONGSIDE THE LEADING INDUSTRIES OF THE VARIOUS SECTORS

CMS SpA is recognized worldwide as a **leader** in the **flexibility, efficiency and quality** of its products. CMS represents **excellence** in many sectors, such as:

- aerospace industry
- automotive
- marine industry
- eyewear
- production of wind turbines, engineering
- building, architecture & interior design
- sculpture



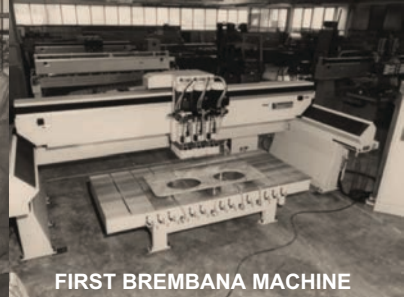
FIRST CMS HEADQUARTERS



FIRST CMS CNC MACHINE

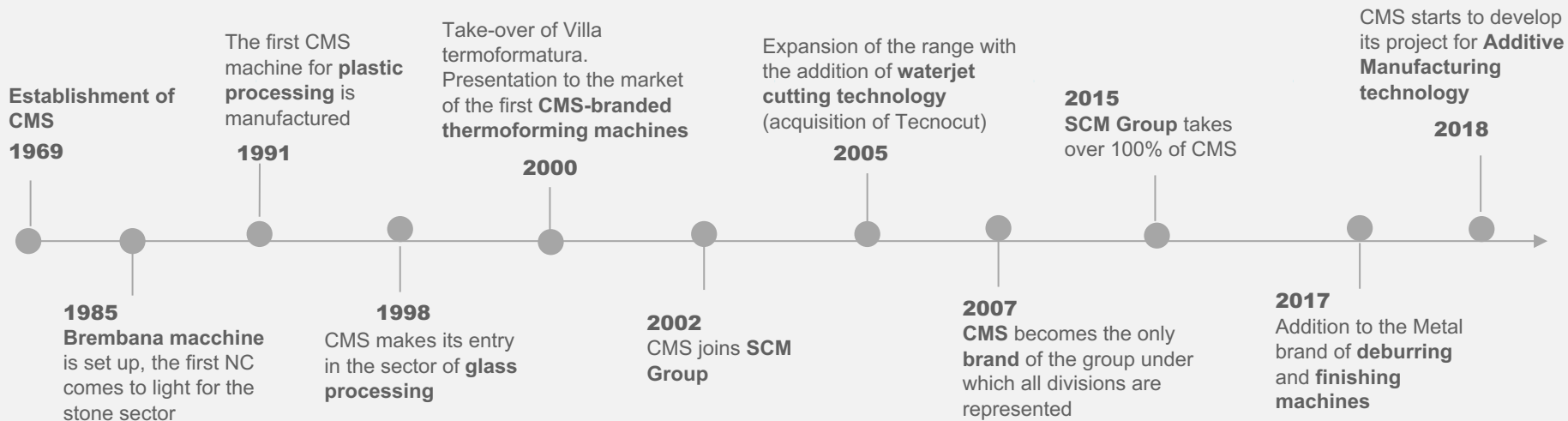


1970; THE TEAM

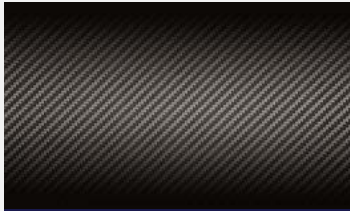


FIRST BREMBANA MACHINE

Cms AN EVER-GROWING PROCESS



CMS BRANDS



**ADVANCED
MATERIALS
TECHNOLOGY**



**PLASTIC
TECHNOLOGY**



**STONE
TECHNOLOGY**



**GLASS
TECHNOLOGY**



**METAL
TECHNOLOGY**



CMS Plastic Technology produces **numerically-controlled machining centres** and **thermoforming machines** for the working of plastic materials, offering technologically advanced solutions.

The brand originates from the winning synergy between the technical-industrial expertise in thermoforming of the historical company Villa, established in 1973, and CMS' historical know-how in milling.

Thanks to constant **investments in research and innovation**, CMS Plastic Technology is recognized as **unique partner** for the whole process: from **thermoforming** to **trimming** to the realization of **models** and **moulds**, ensuring **maximum productivity**.

CMS Plastic Technology is at the forefront of manifold sectors, such as

- **automotive**
- **aerospace**
- **earth-moving machines**
- **caravans & buses**
- **railway industry**
- **bathtubs**

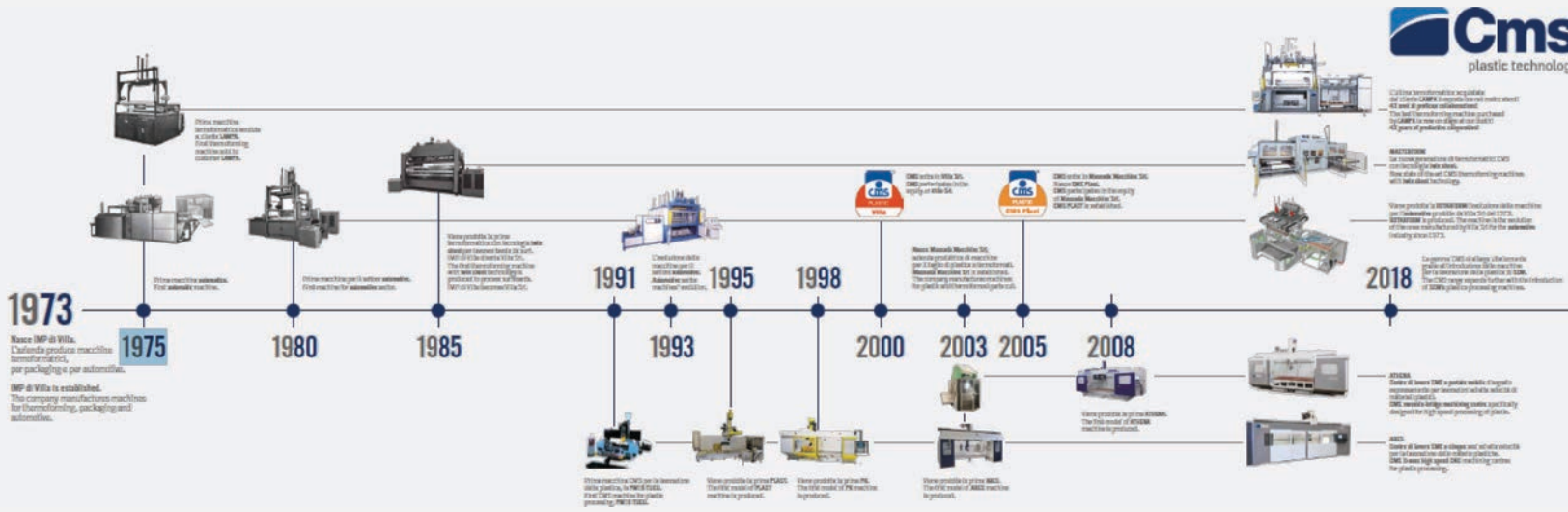
PLASTIC MATERIALS PROCESSING AND THERMOFORMING



TECHNOLOGIES FOR PLASTIC PROCESSING	ORIGINAL BRANDS
3/5 AXIS MACHINING CENTRES FOR MODELS AND MOULDS	CMS
THERMOFORMING, PRESSURE FORMING, VACUUM FORMING, TWIN SHEET	CMS - VILLA
5 AXIS MACHINING CENTRES FOR MODELS AND MOULDS	CMS
COMPLETE WATER-JET CUTTING SYSTEMS	TECNO CUT

Timeline

**SPECIALISTS
IN PLASTICS
PROCESSING
SINCE 1973**



2018
La prima generazione di termoforniche CMS con tecnologia Villa Drive.
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2018
Prima macchina per il settore MECC. Primi macchine per il settore MECC.

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Prima macchina per il settore MECC. Primi macchine per il settore MECC.

Vacuum Forming

Products made with vacuum forming for low volume manufacturing are often used in place of complex-shaped components constructed from fabricated sheet metal.

Fabricated sheet metal products often require extensive operations pertaining to welding, grinding, and finishing. Likewise, when compared to other plastic forming operations such as resin transfer and fiber-reinforced plastics molding, vacuum formed parts are often more favorable due to better cosmetics and economics.

This is why so many low volume manufacturers choose this option.

Products Vacuum forming for low volume manufacturing is ideal for numerous applications.

Some examples include the following application fields:

- . Electronics
- . Industrial
- . Consumer Products
- . Packaging
- . Automotive
- . Retail
- . Display
- . Construction
- . Medical and Healthcare
- . Outdoor Kiosks
- . ATMs
- . Railcars

Advantages of Thermoforming Process

- Extremely adaptive to customer design needs
- Rapid prototyping development
- Material and process is optimized for cost effectiveness
- High-speed production allows for just-in-time shipments
- Flexible tooling design offers a competitive advantage
- On-the-fly product enhancements with low additional costs
- Visually pleasing appearance
- Weight savings for consumer and manufacturer
- Wider design scope
- Lower tooling costs
- No anticorrosion spray necessary
- Paintable and colored plastic availability
- Fully integrated process with limitless flexibility for small to large product designs

Automotive

Excavators – harvesters – tractors - telehandlers – forklifts.... Etc.



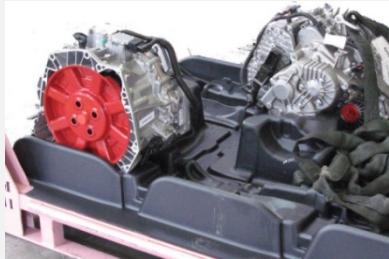
Automotive

Trucks – buses – caravans – micro cars - recreational vehicles.... Etc.

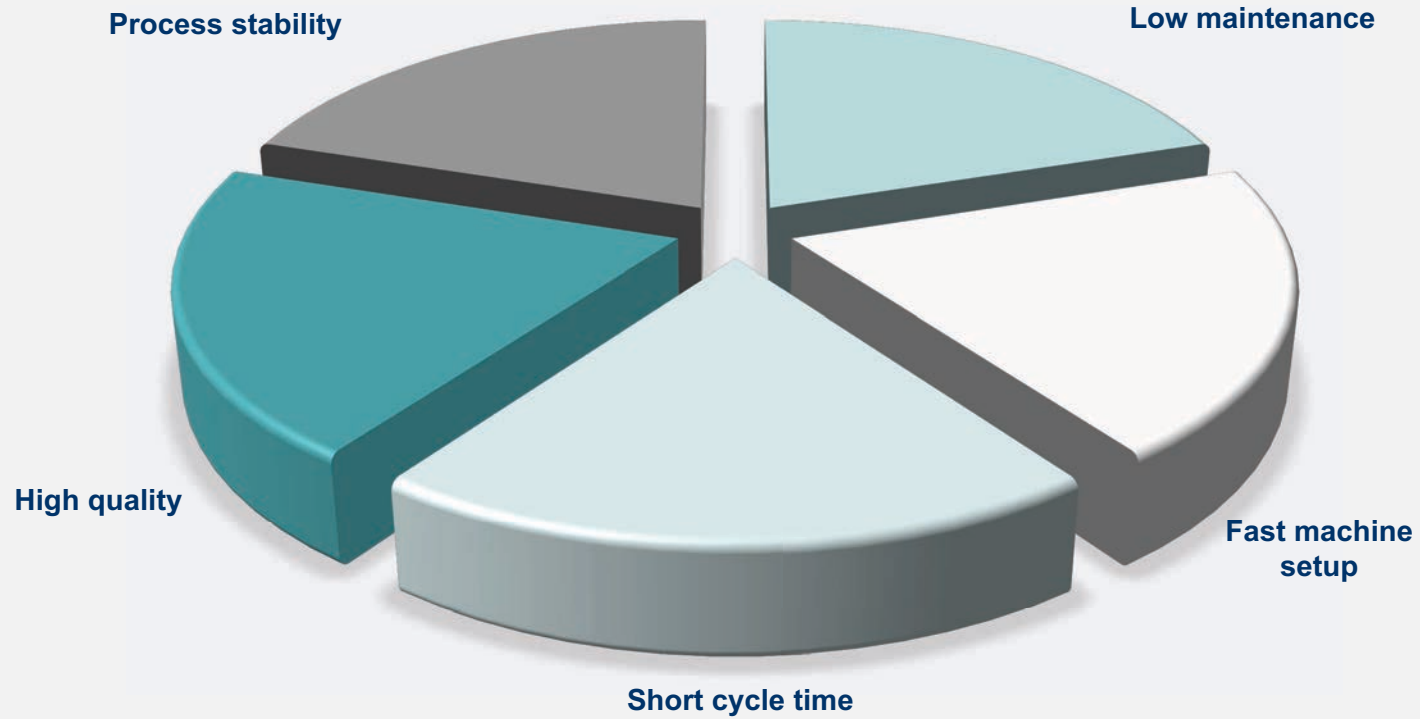


Cosumer

Medical – healthcare – wellness – sanitary- sport & leisure – displays – packaging... Etc.



Vacuum forming efficiency



Process stability

Vacuum forming process is a sequence of different operations. Every cycle parameter must be controlled and synchronized with others in order to obtain the desired result according to material behaviours.

These elements are mandatory:

- Highest plastic material quality
- Sensor integration to collect data
- Environment compensation
- No human intervention
- Real time control system

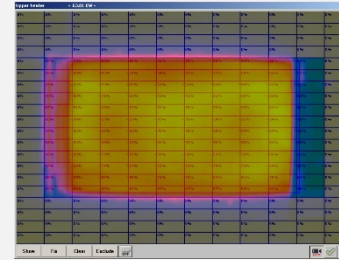
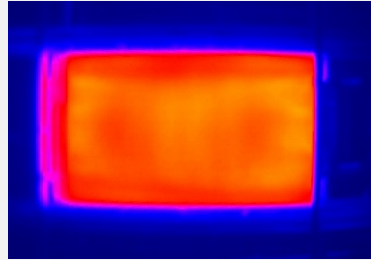
With a stable process is possible to obtain the so called “first good piece” when starting a production and no production waste.

In other words a stable process is synonymous of efficiency.

CMS machines has different solutions for achieving this result

Process stability

- Contactless sensors for checking real time material temperature
- Self compensation with thermic footprint: CMS Thermo Prophet system



- Laser/IR measurement system for pre-stretch bubble
- Vacuum and pressure sensors
- Electronic proportional system for changing vacuum flow and pressure
- NC system controlling brushless motors
- Use of the most suitable heating technology

Process stability



CERAMIC ELEMENTS

Standard solution for general applications.



QUARTZ ELEMENTS

Faster setup with more heating efficiency.



HALOGEN LAMPS

Short heating times with maximum efficiency.

	Ceramic resistance HTS	Quartz element	Speedium Halogen	Short Waves Halogen
Infrared waves	Long Wave	Medium wave	Short/Medium Wave	Short Wave
Preheating time	15/30 min	5 min	1 min	1 min
Switch on/off time	5 min	30 sec	< 1 sec	< 1 sec
ABS/PMMA 4 mm RED	28 pcs/hour	30 pcs/hour	42 pcs/hour	40 pcs/hour

Low maintenance and fast support

- Simple mechanical system thanks to electronic solutions
- High quality in materials
- Information from the software for predictive maintenance
- Direct support to CMS for fast diagnosis:

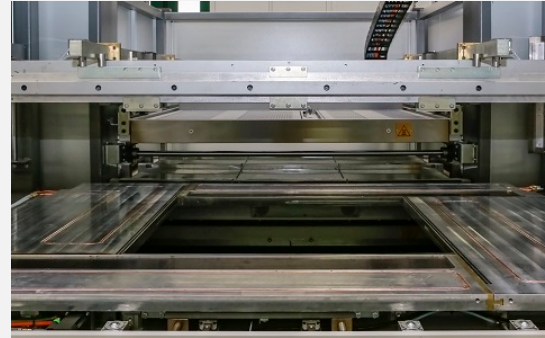
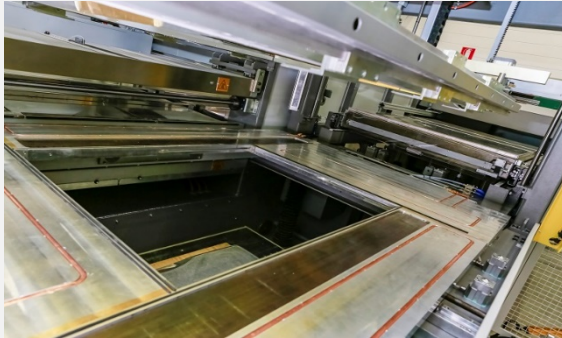


Fast machine setup

Mould setup outside the machine for an easy setup



Self adapting frames for optimizing sheet size reducing waste



Thermoforming Machines categories

CMS has a full range of Thermoforming machines:

- Single station machines
- Machines with automatic sheet loading / part unloading
- Machines with pre-heating station
- Machines with twin-sheet stations
- Machines with pressure forming capabilities

All these machine categories shares same technologies coming from long experience in thermoforming machines building and from continuous development under different markets needs, internal studies and customers requests.

The result is the possibility to offer the right machine, always.

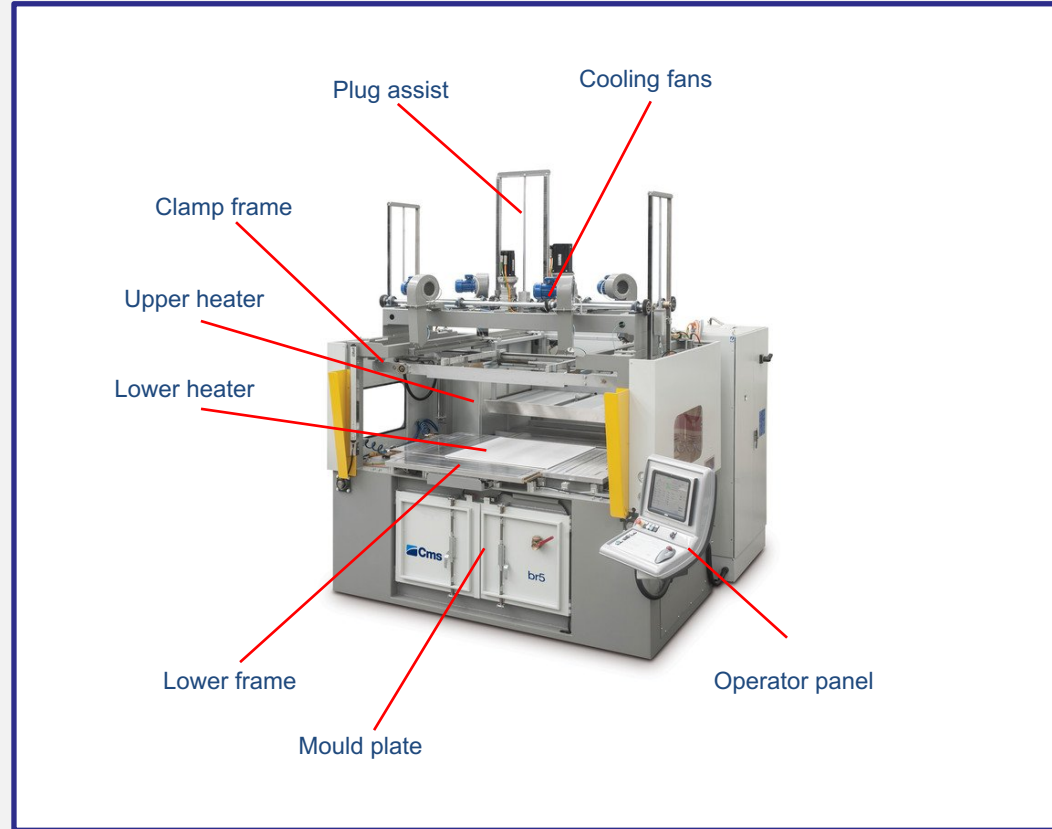
Thermoforming Machines categories

	BR5	BR5 S	BR5 HP S	BR5 CS	BR5 SPA	MASTER FORM
Automatic loader/unloader		✓	✓	✓		✓
Preheating station				✓		
Vacuum forming	✓	✓	✓	✓	✓	✓
Pressure forming			✓			✓
Twinsheet forming						✓
Zero sag	✓	✓	✓	✓		

BR5: Single station machine

Single station machine where all the functioning, loading/unloading of the plastic sheet, plastic heating, forming part and cooling are made in the same station.

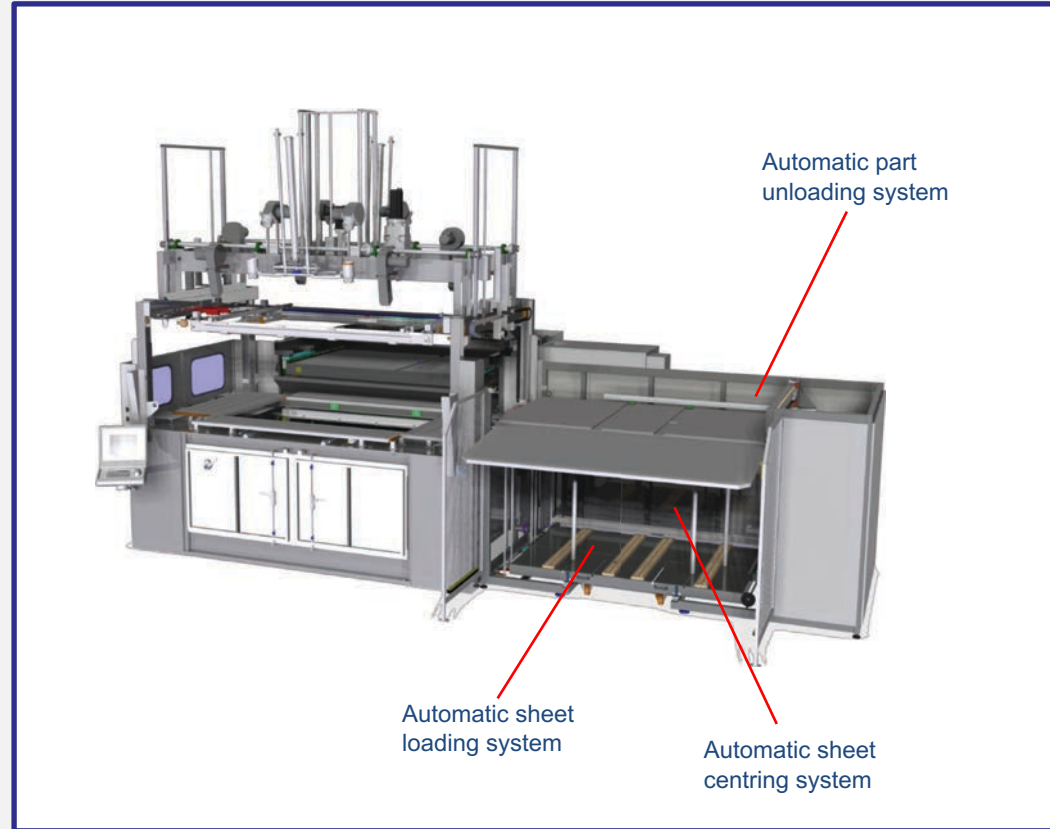
- Forming station with electric movement of mould plates.
- Heating panels with electric or pneumatic movement.
- Sheet clamping frame.
- Cooling devices.
- Vacuum plant with vacuum pump.
- Operator panel with a dedicated software.
- Sheet sizes up to 4000 x 3000



BR5: Automatic loading/unloading

By adding loading station to a standard BR5 single station you obtain BR5 S capable of:

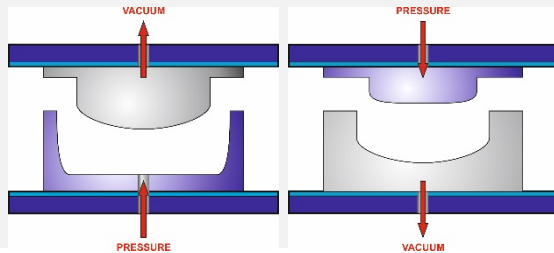
- Automatic sheets centering directly from pallet
- Automatic sheets loading
- Automatic part unloading
- Double sheet detection / solving system
- Sheet sizes up to 4000 x 3000



BR5 HP S: Vacuum and pressure forming

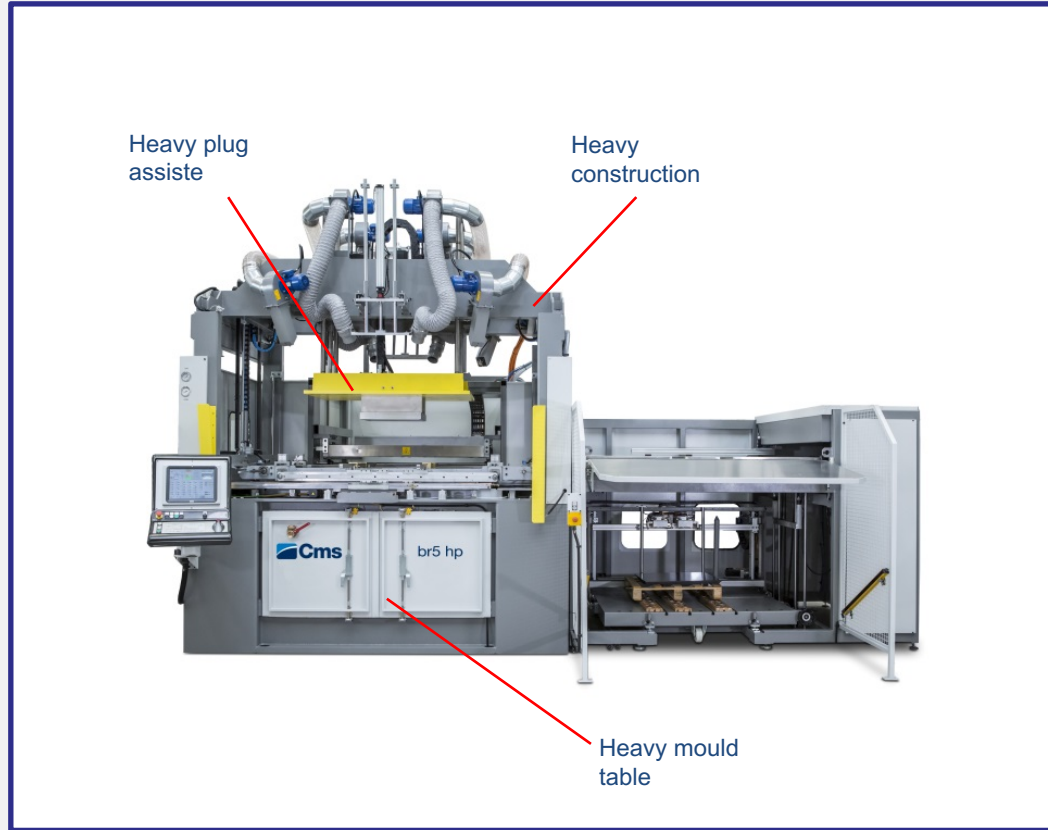
BR5 can be configured with a heavier structure and 4-motors driven tables system both on mould plate and plug assist. This configuration gives to BR5 the possibility to apply pressure (mechanical or pneumatical) using top mould.

- 50 tons maximum clamp torque
- Vacuum and/or pressure software selected on both mould table and plug assist
- Automatic independent greasing system on both mould table and plug assist
- Sheet sizes up to 3000 x 2000



Male mould

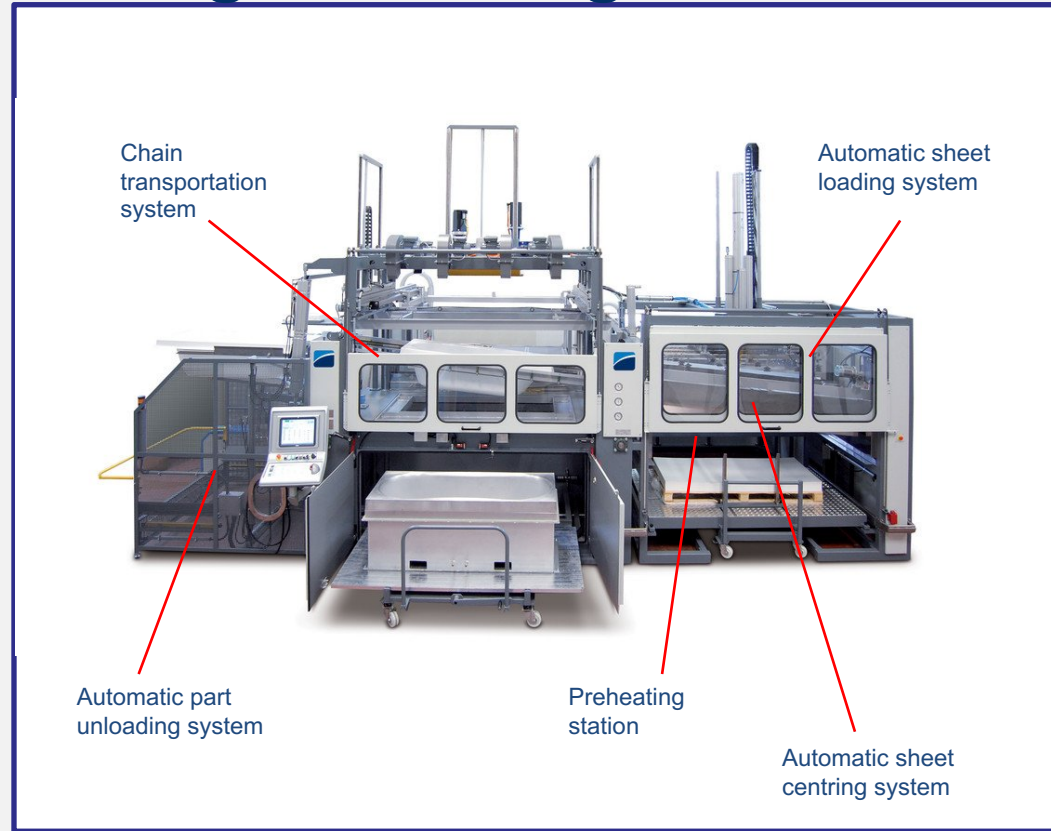
Female mould



BR5 CS: Automatic loading/unloading with preheating

Starting from BR5 single station is possible to have a preheating station and a chain transportation system. This in-line layout grant high production rates by masking part of the heating cycle.

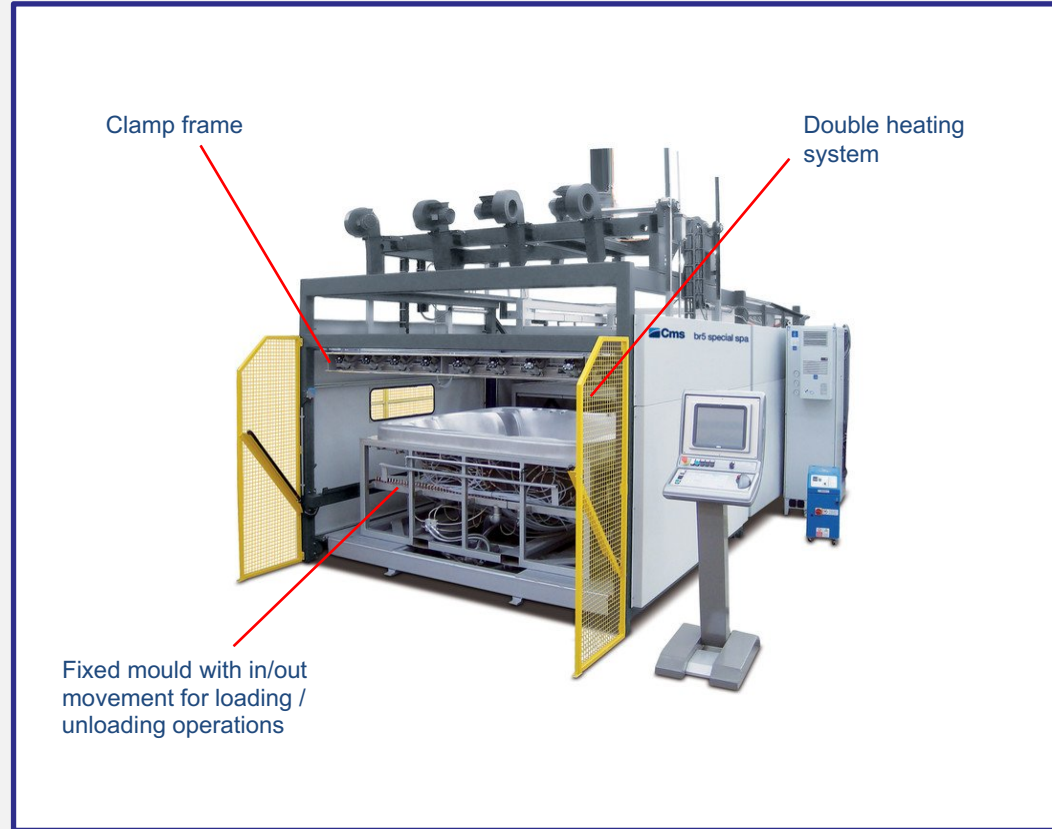
- Single or double preheating system
- Automatic preheating time prediction made by software
- In line design with continuous sheet clamping on 2 sides
- Sheet sizes up to 2500 x 1600



BR5 SPA: Special application for SPA

Non zero-sag machine designed for producing SPA.

- Upper and lower heating table
- Automatic mould extraction for loading sheets / unloading finished parts
- Modular design with maximum sheet width 2550 mm with tailor-made length



MASTERFORM: Shuttle machine

Absolute new machine concept. Its shuttle design gives to this project big flexibility and highest production rates.

Can be used for Vacuum forming, Pressure forming, Twinsheet forming. Using 2 heating stations is possible to mask completely, while in single sheet mode, heating time granting really short cycle times.

Twin sheet is obtained with 2 absolutely independent heating stations that are able to heat-up different sheet thickness, colour, quality, etc. Machine design allow to insert big cores between two parts while in twinsheet mode. Two tables are fully guided and can reach up to 120 tons of clamping force.



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**THANKS FOR YOUR
KIND ATTENTION!**