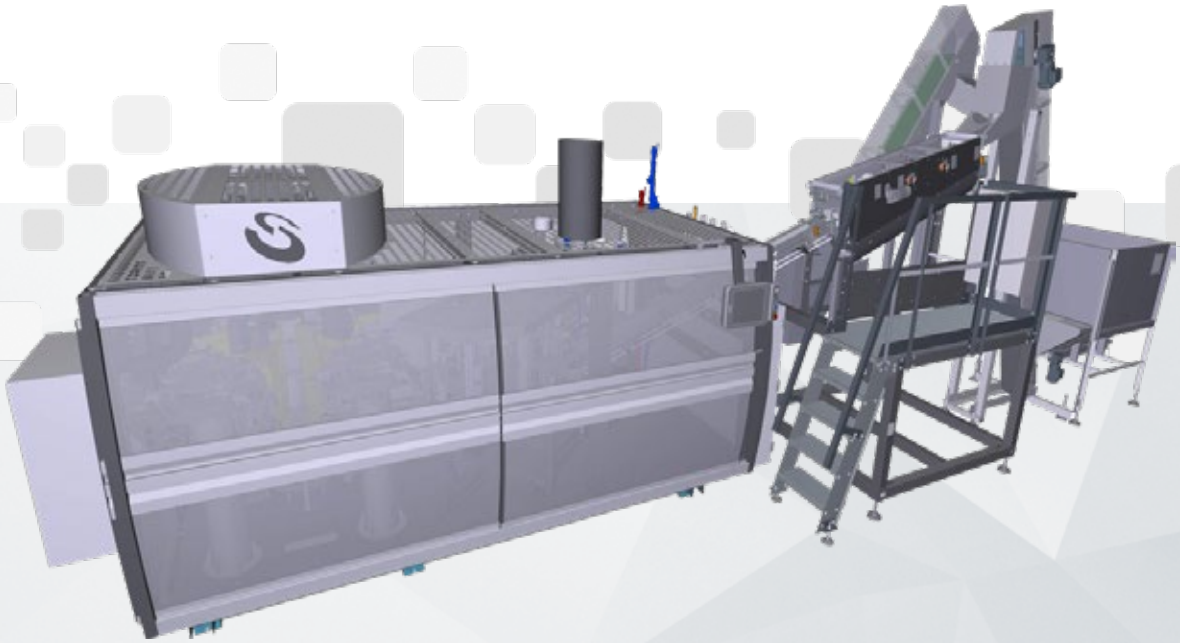
BLOWERS, FILLERS AND ECOBLOC® SYSTEMS

4.0 INDUSTRY compliant

IoT ready

smi



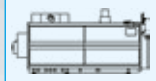
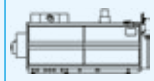
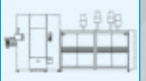
ONE SERIES, A HUNDRED POSSIBILITIES

The new EBS (Electronic Blowing System) ERGON series of cam-free stretch-blow moulding machines featuring a fully electronic stretch-blowing process arises from SMI's 20-year-long experience in the manufacturing of rotary machines and is the outcome of a challenging Research & Development project lasted two years.

More in details, the range of SMI blowers includes:

- 3 EBS K ERGON models, from 2 to 4 cavities, ideal for the production of rPET/PET and PP bottles up to 3 L, with a maximum output of 2,500 bph/cavity*;
- 4 EBS KL ERGON models, from 4 to 10 cavities, ideal for the production of rPET/PET and PP bottles up to 3 L, with a maximum output of 2,500 bph/cavity*;
- 4 EBS E ERGON models, from 12 to 20 cavities, ideal for the production of rPET/PET and PP bottles up to 3 L (up to 0.75 L for EBS 20 E), with a maximum output of 2,500 bph/cavity*;
- 3 EBS KL HC (High Capacity) ERGON models, from 3 to 6 cavities, specifically designed for the production of high-capacity rPET/PET and PP containers up to 10 L with a maximum output of 1,200 bph/cavity*.

*Depending on the machine model and container's features.

	EBS 3 KL HC	EBS 4 KL HC	EBS 6 KL HC	EBS 2 K	EBS 3 K	EBS 4 K	EBS 4 KL	EBS 6 KL	EBS 8 KL	EBS 10 KL	EBS 12	EBS 14	EBS 16	EBS 20
MAX OUTPUT SPEED	Up to 3.600 BPH	Up to 4.800 BPH	Up to 7.200 BPH	Up to 5.000 BPH*	Up to 7.500 BPH*	Up to 10.000 BPH*	Up to 9.200 BPH*	Up to 15.000 BPH*	Up to 20.000 BPH*	Up to 25.000 BPH*	Up to 30.000 BPH*	Up to 35.000 BPH*	Up to 40.000 BPH*	Up to 50.000 BPH*
N° MOULDS	3	4	6	2	3	4	4	6	8	10	12	14	16	20
CONTAINER SIZE	(min Ø = 44 mm max Ø = 215 mm)	(min Ø = 44 mm max Ø = 215 mm)	(min Ø = 44 mm max Ø = 215 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 120 mm)	(min Ø = 44 mm max Ø = 75 mm)
	(min Ø = 1.73 in max Ø = 8.47 in)	(min Ø = 1.73 in max Ø = 8.47 in)	(min Ø = 1.73 in max Ø = 8.47 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 4.72 in)	(min Ø = 1.73 in max Ø = 2.95 in)
ELECTRICAL POWER	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz	400 V +/-10% 3PH+N+PE 50/60Hz
MACHINE SIZE**	4775 x 2623 x 2356 mm	4775 x 2623 x 2356 mm	4775 x 2623 x 2356 mm	2320 x 3280 x 2300 mm	2320 x 3280 x 2300 mm	2320 x 3280 x 2300 mm	4775 x 2623 x 2356 mm	4775 x 2623 x 2356 mm	4775 x 2623 x 2356 mm	4775 x 2623 x 2356 mm	5800 x 3900 x 2550 mm	6800 x 3900 x 2550 mm	6800 x 3900 x 2550 mm	7300 x 3900 x 2550 mm
	15.66 X 8.60 X 7.73 ft	15.66 X 8.60 X 7.73 ft	15.66 X 8.60 X 7.73 ft	7.61 x 10.76 x 7.55 ft	7.61 x 10.76 x 7.55 ft	7.61 x 10.76 x 7.55 ft	15.66 X 8.60 X 7.73 ft	15.66 X 8.60 X 7.73 ft	15.66 X 8.60 X 7.73 ft	15.66 X 8.60 X 7.73 ft	19.02 x 12.79 x 8.36 ft	22.31 x 12.79 x 8.36 ft	22.31 x 12.79 x 8.36 ft	23.95 x 12.79 x 8.36 ft
														

The stated values are not binding, as they have to be confirmed by SMI according to production conditions and preform/container technical specifications.

* 0,5 L container. ** Length x width x height. Without preforms hopper and unscrambler.

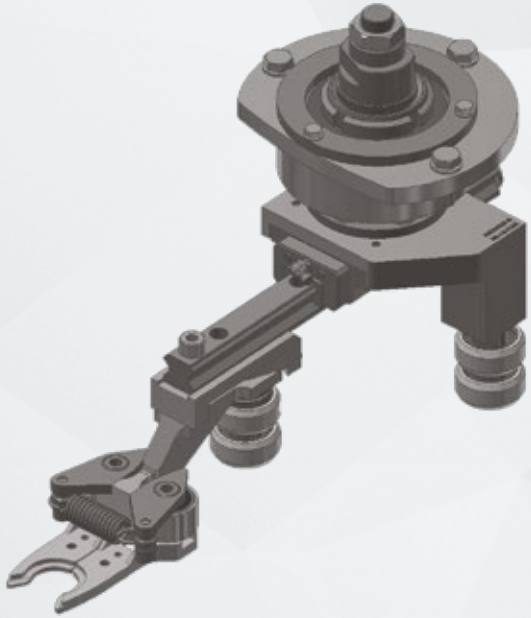
Features and benefits

Preform orientator

- sturdy preform-lifting and orientating unit equipped with staircase and elevated platform
- recovery of the preforms in excess, carried back to the hopper automatically

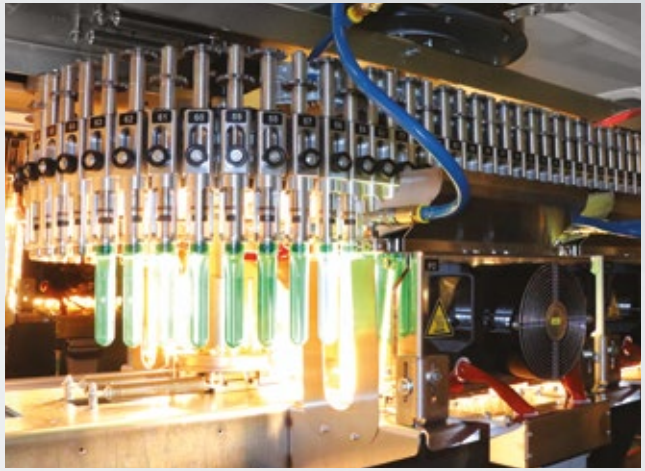
Rotary groups of grippers

- positively actuated valve gear control of the grippers' rotary groups through a double cam

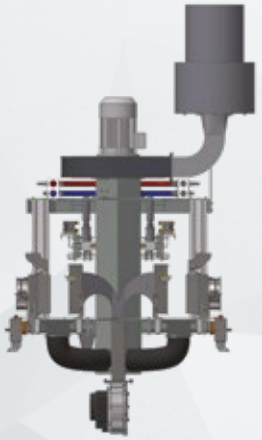


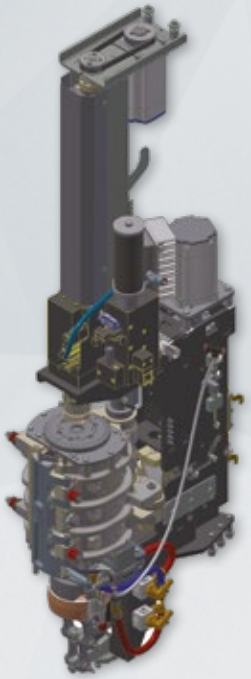
Preform-heating module

- horizontally positioned short-wave infrared ray lamps, grouped in various sections
- up to 8 short-wave infrared ray lamps for each section of the heating module
- possibility to set and modify the parameters of each lamp through the POSYC® operator panel
- preform heating lengthwise differentiated and radially homogeneous
- heat-reflecting panels, made of composite material, mounted on the front and at the rear of the infrared lamps to increase radiation intensity and, consequently, cut energy consumption
- mandrels chain pitch to 37/44 mm (for the blowing of containers up to 3 L)



- liquid-fed cooling system, in order to cool the protection ring avoiding the preforms thread deformation during the heating process
- air-fed cooling system, in order to keep the heating module temperature constant and low enough
- modular design, standardised for all stretch-blow moulders models



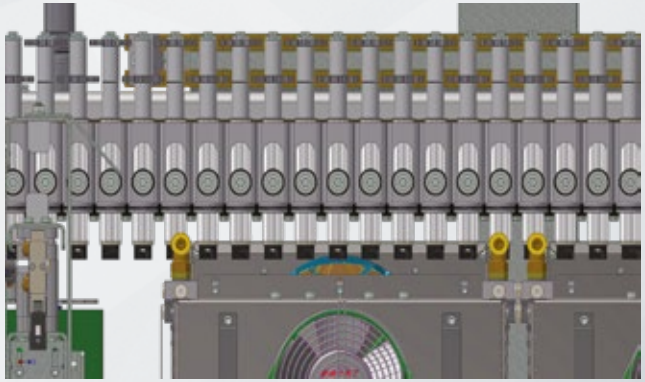


» Stretch-blow moulding wheel

- precise and highly reliable cam-free technology
- standardized stretch-blowing stations for all blow moulders models, with a low dead volume thanks to high performance valves and optimized circuits
- liquid-fed cooling system, in order to keep the moulds temperature constant
- air recovery system supplied as a standard equipment
- moulds treated on the surface and made from a special aluminium alloy highly resistant to wear
- mould-holders made from an austempered iron casting highly resistant to mechanical stress
- motorized stretching rod to boost speed and enable a more flexible management of the stretching process.

» New and compact preform-heating module

The stretch-blow moulding machines of the EBS ERGON series are equipped with a newly designed preform-heating oven featuring compact size, horizontally deployed chain of preform-carrying mandrels (37/44 mm pitch for the blowing of containers up to 3 L) and optimised ventilation and aeration system.
The cutting-edge concepts used in the design of the new ERGON machine range have allowed to shorten the oven by 50% in comparison with conventional equipment, thus reducing the number of preforms that in a given moment are passing in front of the heating panels.
The new heating module is equipped with a system of heat-reflecting panels made of highly energy-efficient composite material, deployed both in front of and behind the short-wave infrared ray lamps heating preforms up; such innovative solution allows a high degree of reflection of the heat generated by the lamps and, hence, assures a more uniform thermal distribution all over the preform surface.
Thanks to the cutting-edge technologies they feature, the new EBS ERGON blow moulders by SMI stand out for low energy consumption and the utmost environment-friendliness of the stretch-blow moulding process.



» Electrical panel and machine wiring

- electrical panel integrated in the heating module, thus reducing the machine overall dimensions; as a consequence, the final user has larger space to install any optional equipment or additional accessories. Moreover, the machine structure is more compact and the access to it is easier, thanks to the elimination of the power cables (air or ground cables) that are generally used for the connection with the external electrical panels
- use of pre-assembled and pre-tested cables
- ethernet communication ring
- SERCOS interface™ field bus

Features and benefits

Top level reliability and efficiency

The new EBS ERGON series is more sturdy, compact, flexible, technologically advanced and performing than the previous series, thanks to an array of technical innovations applied to the stretch-blowing process.
As a matter of fact, the stretch-blowing module of the EBS ERGON range is equipped with motorized stretching rods whose operation, electronically controlled, needs no mechanical cams.
Such innovation allows to precisely manage the stretching rod ride and to accurately control its position, while providing significant energy savings.
Furthermore, the new technology enables to change the stretching process speed without any mechanical interventions (cam replacement) and to remarkably reduce the vibration stress affecting the blowing wheel in traditional solutions.
The EBS ERGON series is also equipped with a system of valves featuring high performances and low dead volumes that allows to shorten the duration of pre-blowing and blowing operations with benefits in terms of machine yield, compressed air savings and the quality of the bottles being manufactured.

Easy and cost-cutting machine management, cleaning and maintenance

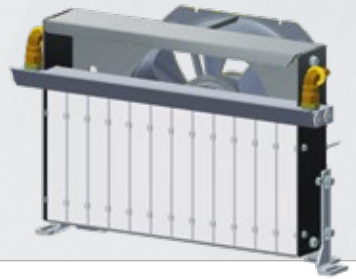
The stretch-blowmoulders of the EBS ERGON series stand out for their compact, ergonomic and functional configuration, capable of considerably simplifying the operations of machine management, cleaning and maintenance and of assuring significant space savings within the bottling facility. The protection doors of the new EBS ERGON models feature a slightly curved profile that provides broader space inside the machine, so that the operator can easily and safely carry out cleaning and maintenance interventions. New SMI blowers' ergonomics is further enhanced by the advanced technology used in the MotorNet System® automation and control system, that constantly keeps working parameters at optimal levels throughout the manufacturing process and allows the direct change of machine settings.

Low noise and reduced mechanical stress

On EBS ERGON series of stretch-blow moulders an innovative system takes care of operating both the up/down movements of the mould bottom and the opening/closing of the mould holding unit, thus remarkably reducing the mechanical stress and the noise level of this section of the machine.

High-performance reflective thermal panels to heat the preforms

Among SMI's main actions to reduce energy consumption, the one that stands out is the innovative heat-reflecting panel system mounted on the stretch-blow moulders both on the front and at the rear of the short-wave infrared ray lamps designed to heat the preforms. These panels, made of composite material, highly reflect the heat generated by the lamps, which operate at given wavelengths. The reflection process increases the intensity and quality of the thermal radiation to which the preforms are subjected, allowing a more uniform heat distribution over their entire surface and, consequently, the reduction of the number of lamps installed in the machine, as compared to traditional heating solutions. The greater energy efficiency of the foregoing innovative solution allows the end user to reduce the consumption of the electricity related to the power supply of the preform-heating lamps, with energy savings of up to 30% compared to traditional systems not equipped with this technology; of course, actual savings depend on system performance, size of the bottle to be manufactured, grammage and color of the preform used and other environment and production variables.



Air Master recovery system

All of EBS ERGON stretch-blow moulders of the latest generation are equipped with a built-in, high efficiency air recovery system, named AIR MASTER, which allows to recover air from the blowing circuit.

The system is based on a two-stage architecture (1st and 2nd stage), as follows:

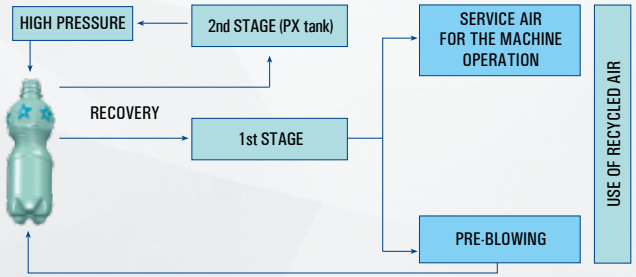
The 1st stage allows to re-use the air recovered to feed:
- the service air circuit
- the low-pressure line feeding external units
- the pre-blowing circuit

The 2nd stage (PX tank) allows to re-use the air recovered to feed:
- the 1st stage of the blowing process

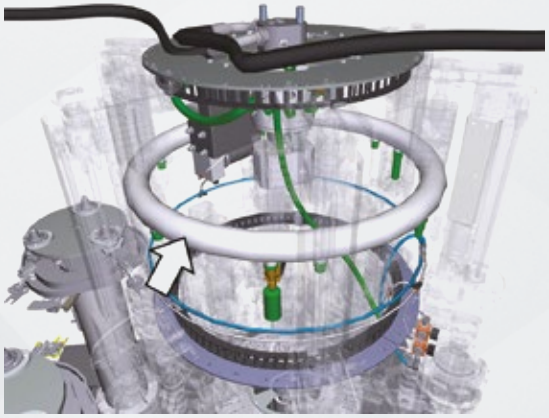
The Air Master system ensures a remarkable reduction in the compressed air consumption and a substantial energy saving, thanks to the lesser use of the high pressure air compressor.

EBS E / K / KL / KL HC models are equipped with two valves for each stretch-blowing station: the first one introduces the air into the air recovery system tank, the second one lets the air into the PX tank and withdraws the air from the same tank.

The Air Master system ensures a considerable reduction in energy costs and up to 40% savings (with a PX tank installed) in the compressed air consumption; thanks to the recovery system, a part of the air in the blowing circuit is recovered and recycled for the pre-blowing circuit and for the machine service air (1st stage); furthermore, thanks to the 2nd stage circuit, the air recovered is also used in the blowing process.

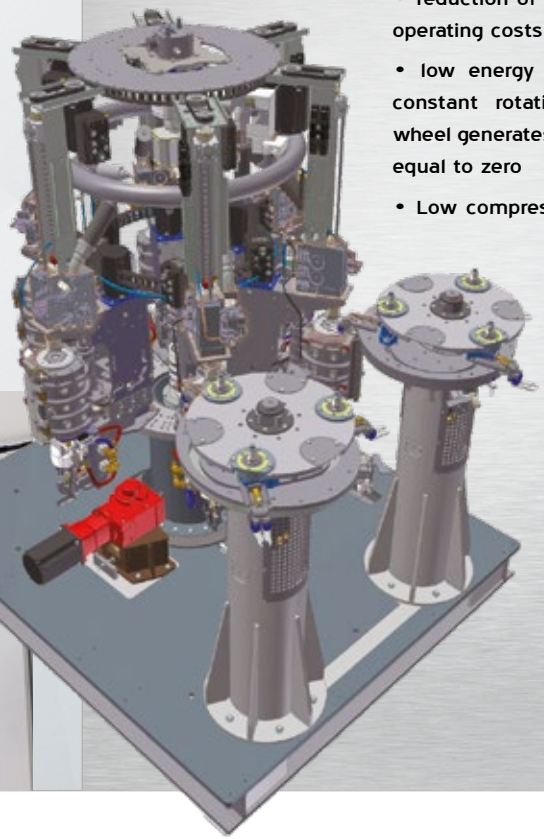


COMPRESSED AIR RECOVERY SYSTEM



Why choose SMI rotary technology

- fully electronic blowing technology developed in order to reach high outputs and excellent performances
- accurate heating profile, differentiated for each preform
- single-cavity moulds (they can contain one preform only)
- control and check of each mould and, consequently, of each cavity, by means of "Intellicavity" technology
- precise and constant monitoring of all phases of the stretch-blowing process, thanks to the specific parameters for each preform
- quick changeover and mould replacement
- reduction of the maintenance and operating costs
- low energy consumption, as the constant rotation of the blowing-wheel generates inertial loads almost equal to zero
- Low compressed air consumption, thanks to the air recovery system and to the low dead volume of each stretch-blowing station
- In case of failure, possibility to stop a stretch-blowing station, while keeping the machine running



SERIE EBS E

EBS E ERGON
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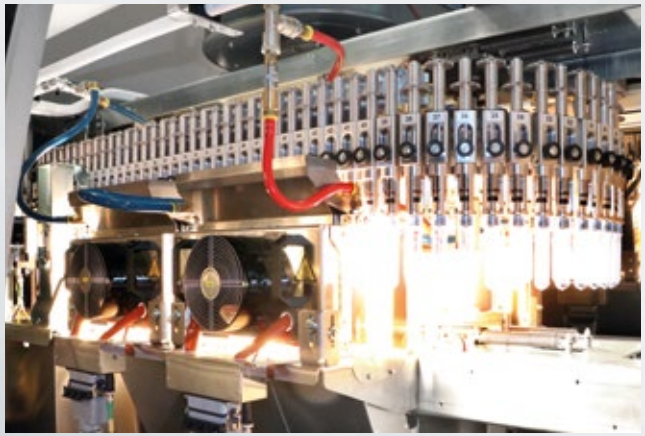
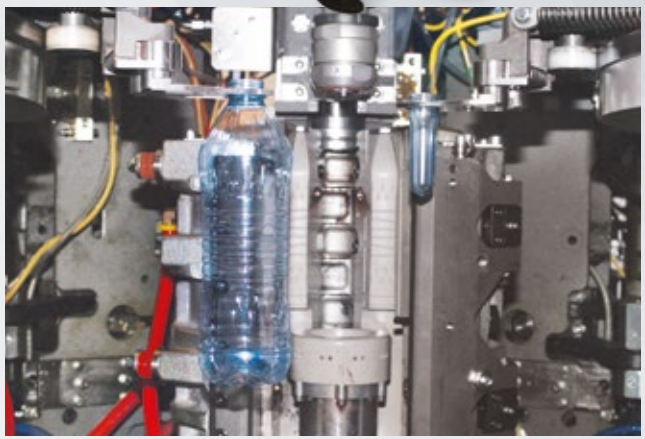
The EBS E ERGON project is based upon all-electronic processes which allow to get rid of the whole of mechanical movements and related cams and ultimately make the blower a cam-less machine.
The new range is composed of 4 models, from 12 to 20 cavities, suitable for the production of bottles with a maximum output of 2,500 bph/cavity.
The EBS E ERGON series of rotary stretch-blow moulders ensures high performances in the stretch-blow moulding of PET, rPET and PP bottles, mainly used in the "food & beverage" sector. Thanks to high-tech components, minimized maintenance and operational costs and excellent quality/price ratio, the EBS E ERGON series is the ideal solution for the production of plastic containers of different capacities, featuring various shapes, from the simplest to the most sophisticated ones.





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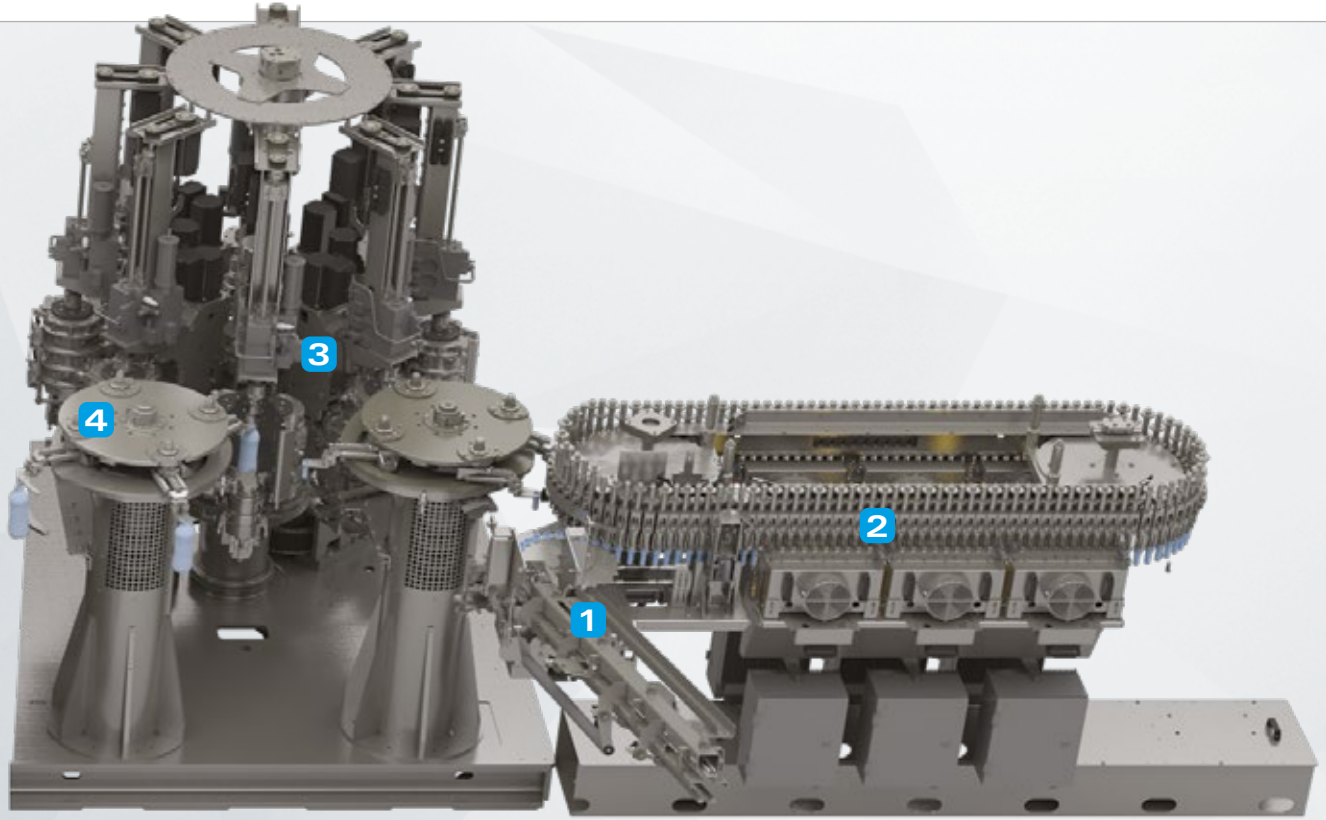


1 PREFORMS FEEDING

Through a lifting belt the preforms are transferred from the hopper to the orientator, that conveys them to an inclined guide, from where by gravitational fall they reach the spacing star-wheel at the infeed of the heating module. Such wheel feeds the chain of mandrels; these latter, while revolving on themselves, "capture" the preforms and carry them all along the heating module's length.

2 PREFORMS HEATING

Before entering the heating module, equipped with short-wave infrared ray lamps, each preform undergoes accurate checks, which detect the preform's size and correct vertical position and automatically discard it if it is not compliant with the pre-set parameters.

During the heating process the preforms constantly turn around themselves, so as to ensure an excellent and symmetrical distribution of the heat generated by the short-wave infrared ray lamps.

The heating module is equipped with two different cooling systems: a liquid-fed cooling system, in order to cool the protection ring that prevents the deformation of the preform neck thread during the heating process; an air-fed cooling system, in order to keep the temperature inside the heating module low enough as to avoid exposing the preform's external surface to overheating.

At the heating module outlet, a sensor detects the preform temperature, compares it with the temperature set point and, if the two values do not correspond, automatically increases or reduces the power of the short-wave infrared ray lamps.

3 PREFORMS STRETCH-BLOW MOULDING

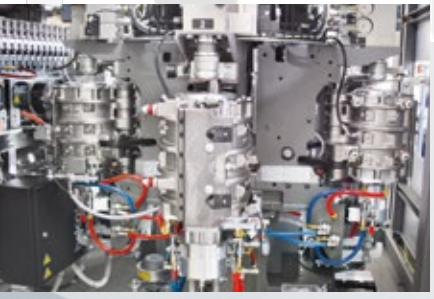
A special rotary group of grippers picks the preforms up from the heating module and sets them into the stretch-blowing stations. The stretch-blowing process includes two phases: stretching and pre-blowing, which occur simultaneously through the descent of the motorized stretching rod and the supply of low pressure compressed air, and final blowing with high-pressure compressed air, through which the containers take their final shape. A counterpressure air system ensures the perfect locking of the moulds, whereas the new system operating the mould mechanical group, paired with the electronic stretching rod, makes EBS ERGON stretch-blow moulders fully automated machines and allows users to benefit from higher kinematic precision, reduced maintenance, less vibrations, low noise operations and longer life of the equipment.

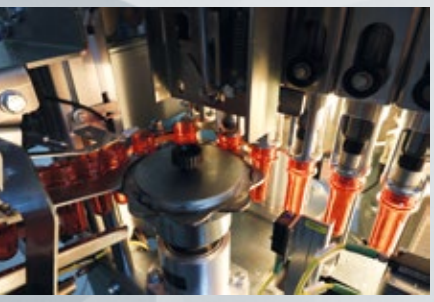
4 BOTTLES OUTLET

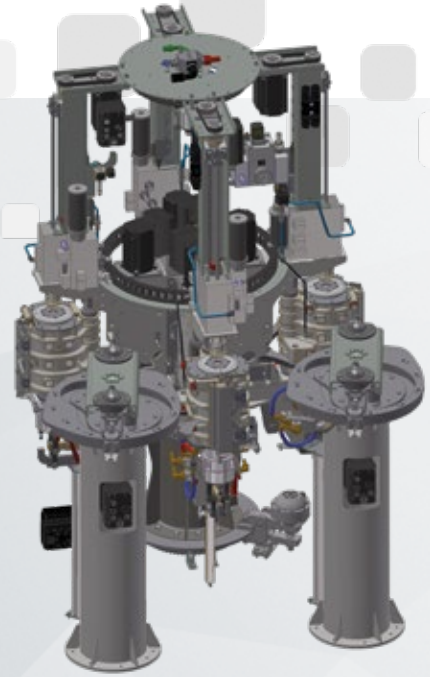
During the blowing process, an accurate measuring system checks the correctness of the pressure profile required throughout the bottle production process.

In fact, in case of pressure drop the container's shape changes and, thus, the machine's control system automatically discards flawed bottles.

The finished bottles are picked from the stretch-blowing stations by another rotary group of grippers which finally transfers them to the filling machines.







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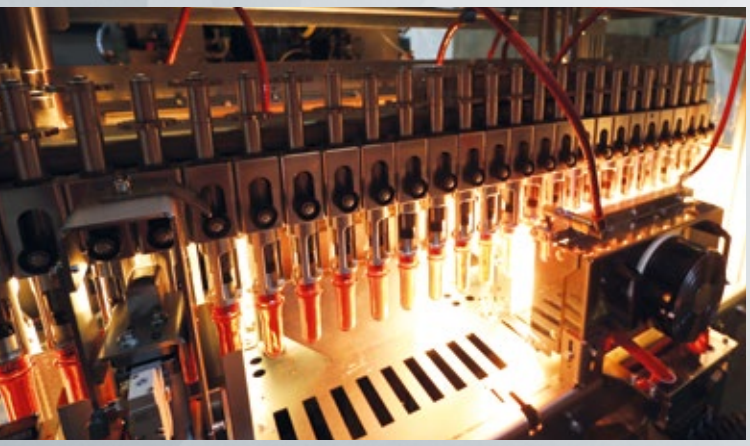


EBS K ERGON SERIES

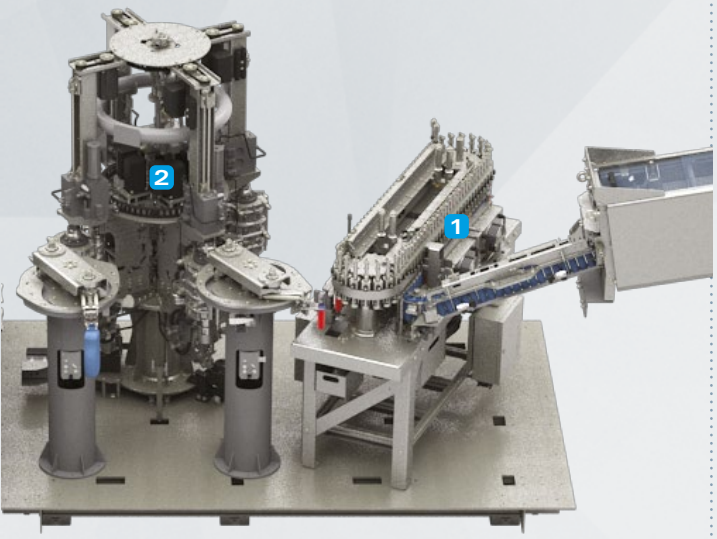
Starting from the countless technical innovations introduced on the ERGON EBS E series stretch-blow moulders, SMI designers have developed a new series of extremely compact, rotary, stretch-blow moulders called ERGON EBS K (the letter K of the name comes from the word "Kompakt"). Capable of satisfying production demands of up to 10,000 bottles/hour*, the new models are available in 2, 3 and 4-cavity versions, and offer all the advantages of rotary technology in a "speed" range (3,000-4,000 to 10,000 bottles/hour), traditionally controlled by linear stretch-blow moulders.

- the preform heating section (tunnel) is integrated with the stretch-blow moulding section (carousel) in a single, extremely compact module, that makes the system suitable for installation even on small bottling lines.
- the structure that contains the tunnel and the carousel is equipped with slightly rounded safety doors, providing more space inside the machine to perform cleaning and maintenance tasks easily and safely.
- the machinery is managed by the MotorNet System® for automation and control, which ensures constant maintenance of optimum processing parameters throughout the entire production cycle and the direct modification of machine settings, thereby simplifying format changeover operations.

*The stated values are not binding, as they have to be confirmed by SMI according to production conditions and preform/container technical specifications.

1 PREFORMS HEATING

The ERGON EBS K stretch-blow moulding system has an innovative preform heating module with an extremely compact design, this allows it to be integrated in the same machine module with the stretch-blow moulder carousel. The module features a horizontal preform feeder chain and an optimized ventilation and aeration system. Moreover, the infrared lamp units, responsible for heating the preforms in transit, are equipped with a system of thermo-reflective panels made of a highly energy-efficient composite material situated both in front of and behind the lamps. This technically advanced solution ensures excellent reflection of the heat generated by the IR lamps, and consequently ensures a more uniform distribution of the heat over the entire surface of the preform. The inside of the module is also equipped with an aluminium diffuser, to provide optimal temperature control and prevent overheating problems.

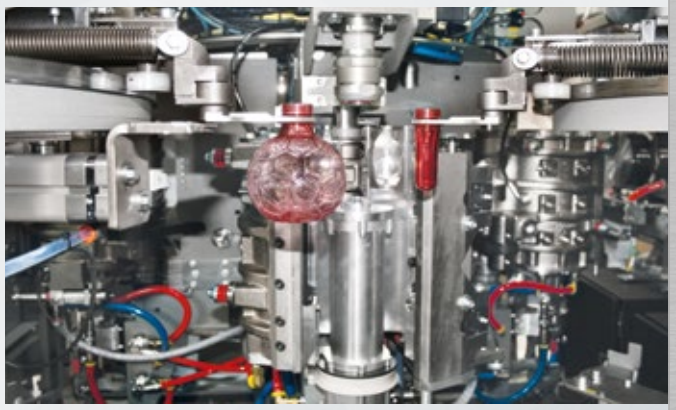


2 PREFORMS STRETCH-BLOW MOULDING

• the carousel of the stretch-blow moulder is equipped with motorized stretch rods, controlled by electronic drives (brushless motors with integrated driver), that does not require a pneumatic cam and the time needed for its replacement, as the servo-motor automatically adjusts depending on the production speed (up to 2.4 m/s). This solution considerably reduces the machine vibrations and the adjustments to be performed in case of format changeover.

• the stretch-blow moulding system uses high-performance, low dead-volume valves that reduce pre-blowing and blowing times, thereby improving efficiency and the quality of the bottles produced.

• the mechanical assembly of the mould is equipped with its own motorization, which ensures the utmost precision for the up/down motion of the mould bottom and the opening/closing of the mould-holder unit. The integration of this innovative solution with the electronic stretch rod system, makes the SMI ERGON EBS K stretch-blow moulders a "cam-free" system, with considerable advantages in terms of greater kinematic accuracy, less maintenance, less vibration, less noise and increased system life.

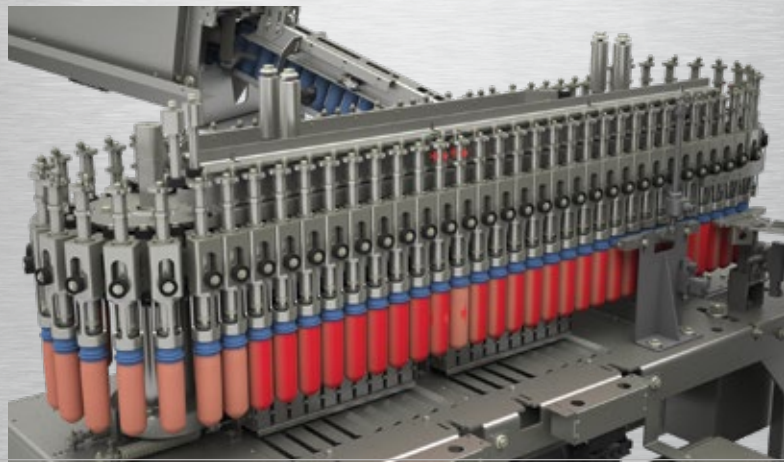


By using a standard heating process, the expansion of material is uniform in all directions; for this reason this is unsuitable for the production of non-cylindrical containers; indeed, the use of a standard heating process on a non-cylindrical container would lead to the premature cooling of non-stretched material, causing non-uniform thickness zones on the final container. Preferential heating uses a differentiated/dedicated temperature profile, allowing the preform to expand in a controlled manner and take the specific shape of the mould.

Preferential heating thus enables to:

- have a better material distribution; in particular it allows to obtain uniform thicknesses on complex containers (i.e. asymmetric, non-cylindrical)
- eliminate zones with an excessive thickness
- facilitate the labelling
- optimize the weight of a particularly complex container

Therefore preferential heating is suitable for the production of containers for detergents, cleaners, cosmetics, pharmaceutical products, sauces, condiments and some alcoholic beverages with the ratio between the long and short side exceeding 2.



EBS KL / KL HC SERIES

EBS KL ERGON
VIDEO
scan this QR code

Starting from the countless technical innovations introduced on the ERGON EBS K series stretch-blow moulders, SMI designers have developed a new series of extremely compact, rotary, stretch-blow moulders called ERGON EBS KL (the letters KL of the name come from the word "Kompakt Large"). Capable of satisfying production demands up to 25,000 bottles/hour*, the new models allow to take advantage of all of the benefits of the rotary technology combined with process automation solutions based on latest generation electronic devices.
More in details, the range of EBS KL blowers includes:

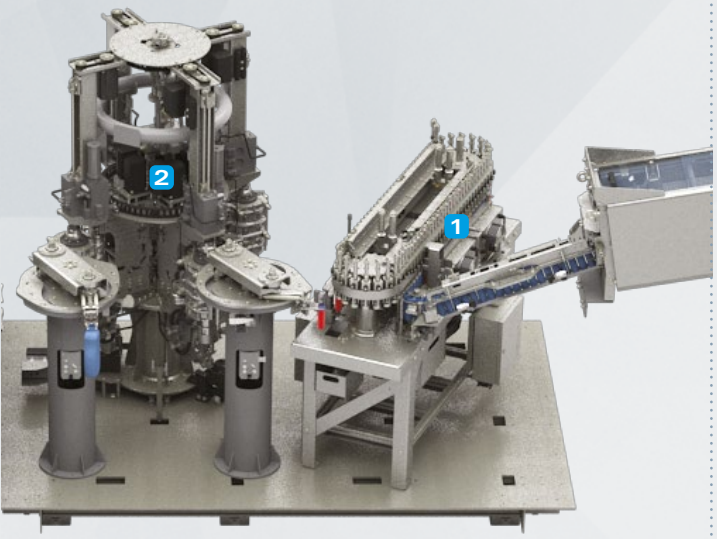
- 3 EBS KL HC (High Capacity) ERGON models, from 3 to 6 cavities, specifically designed for the production of high-capacity rPET/PET and PP containers up to 10 L with a maximum output of 1,200 bph/cavity*;
- 4 EBS KL ERGON models, from 4 to 10 cavities, for the production of rPET/PET/PP bottles up to 3 L, with a maximum output of 2,500 bph/cavity*.

- the preform heating section (tunnel) is integrated with the stretch-blow moulding section (carousel) in a single, extremely compact module, that makes the system suitable for installation even on small bottling lines.
- the structure that contains the tunnel and the carousel is equipped with slightly rounded safety doors, providing more space inside the machine to perform cleaning and maintenance tasks easily and safely.
- the machinery is managed by the MotorNet System® for automation and control, which ensures constant maintenance of optimum processing parameters throughout the entire production cycle and the direct modification of machine settings, thereby simplifying format changeover operations.

*The stated values are not binding, as they have to be confirmed by SMI according to production conditions and preform/container technical specifications.

1 PREFORMS HEATING

The ERGON EBS KL / KL HC stretch-blow moulding system has an innovative preform heating module with an extremely compact design, this allows it to be integrated in the same machine module with the stretch-blow moulder carousel. The module features a horizontal preform feeder chain and an optimized ventilation and aeration system. Moreover, the infrared lamp units, responsible for heating the preforms in transit, are equipped with a system of thermo-reflective panels made of a highly energy-efficient composite material situated both in front of and behind the lamps. This technically advanced solution ensures excellent reflection of the heat generated by the IR lamps, and consequently ensures a more uniform distribution of the heat over the entire surface of the preform. The inside of the module is also equipped with an aluminium diffuser, to provide optimal temperature control and prevent overheating problems.

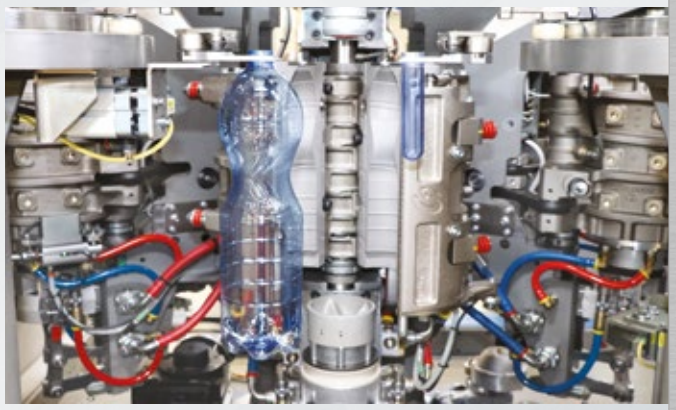


2 PREFORMS STRETCH-BLOW MOULDING

• the carousel of the stretch-blow moulder is equipped with motorized stretch rods, controlled by electronic drives (brushless motors with integrated driver), that do not require a pneumatic cam and the time needed for its replacement, as the servo-motor automatically adjusts depending on the production speed (up to 2.4 m/s). This solution considerably reduces the machine vibrations and the adjustments to be performed in case of format changeover.

• the stretch-blow moulding system uses high-performance, low dead-volume valves that reduce pre-blowing and blowing times, thereby improving efficiency and the quality of the bottles produced.

• the mechanical assembly of the mould is equipped with its own motorization, which ensures the utmost precision for the up/down motion of the mould bottom and the opening/closing of the mould-holder unit. The integration of this innovative solution with the electronic stretch rod system, makes the SMI EBS KL / KL HC stretch-blow moulders a "cam-free" system, with considerable advantages in terms of greater kinematic accuracy, less maintenance, less vibration, less noise and increased system life.



• New motion system of the grippers, based on the preform/bottle grippers without springs equipped with desmodromic cams; this solution optimizes the spaces and reduces the diameter in which the grippers move, thus reducing the wear and increasing the precision of the blow moulder management.

• The grippers boast a sensor-equipped clutch, ensuring that each gripper always keeps the phase position.

• The use of plastic bearings also allows to reduce the wear and the vibrations to which the grippers are subjected, thus eliminating the need for grease to lubricate.

ELECTRONIC FILLERS

Enoberg (company part of the SMI Group) electronic fillers can be combined with SMI stretch-blow moulders for creating compact solutions for stretch-blow moulding, filling and capping rPET/PET and PP containers.

The electronic filling system is based on the use of a flow meter for each filling valve. The flow meter detects the flow of the product that fills each bottle; once the correct volume is reached, the flow meter controls the closing of the filling valve.

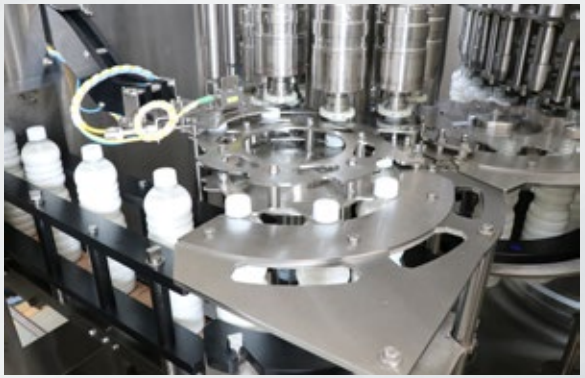
Characterized by a high operational flexibility and capable of meeting the market requirements in terms of hygiene, reliability, ease of use and maintenance, electronic fillers can be divided as follows:

- **HEVF series** suitable for filling flat products:
  - still and carbonated water
  - iced tea
  - clear juice (such as pineapple)
  - fresh milk (7 day shelf life)
  - wine and balsamic vinegar
  - apple vinegar
  - thick juice (such as pear)
  - syrups
  - soy sauce
  - detergents and sanitizers

- **HEMF series** suitable for filling not electrically conductive products, especially oil

- **HEVS series** suitable for filling carbonated products

	0.5 L Containers			5 L Containers	
	HEVF	HEMF	HEVS	HEVF	HEMF
Filling	electronic	electronic	electronic	electronic	electronic
N° of valves	max. 96	max. 60	max. 96	max. 20	max. 20
Max output speed*					
FLAT WATER	55,000 bph	-	36,000 bph	8,100 bph	-
VINEGAR	40,000 bph	-	-	-	-
SYRUP	36,800 bph	-	-	-	-
DETERGENTS	35,000 bph	-	-	-	-
JUICES	31,600 bph	-	-	-	-
FRESH MILK	30,400 bph	-	-	-	-
EDIBLE OIL	-	36,000 bph	-	-	5,400 bph
SPARKLING WATER	-	-	36,000 bph	-	-
SOFT DRINKS (CSD)	-	-	32,000 bph	-	-



- Frame made of AISI 304 stainless steel
- Tempered glass safety guards and sealing gaskets that hermetically seal the filling environment from the external one
- The motion of the machine carousels is driven by robust gears placed in the machine base (HEVF - HEMF series)
- The filling section is completely isolated from transmissions, that therefore do not come in contact with the liquid to be filled (HEVF - HEMF series)
- Filling valve fully made of AISI 316 and characterized by an easy maintenance
- High-precision flow meters installed next to the filling valves
- Dummy bottles with a manual insertion to ensure a complete cleaning and sanitation of the components in contact with the product; dummy bottles with an automatic insertion are available on request (HEVF - HEMF series)
- Product pump that allows to keep the pressure constant during the filling operation (HEVF - HEMF series)
- Quick format changeover of the bottle guide equipment
- Parameters of each format directly controlled through HMI
- 7" HMI touch screen (15" available as an option)
- Dummy bottle positioned directly on the filling valve with automatic activation (HEVS series)

*Maximum output rate of the stand-alone filler, that might be limited in the Ecobloc® configuration

The stated values are not binding, as they have to be confirmed by SMI according to production conditions and preform/container technical specifications.

Operation

4 Empty bottles transfer

After being manufactured by the stretch-blow moulding machine, empty bottles are conveyed from the blower to the filler by "neck-handling" direct transfer by means of adjoining star wheels. The star-wheel at the blow moulder outlet is equipped with grippers electronically synchronised with the brackets of the starwheel at the filler inlet.

5 HEVF Filling

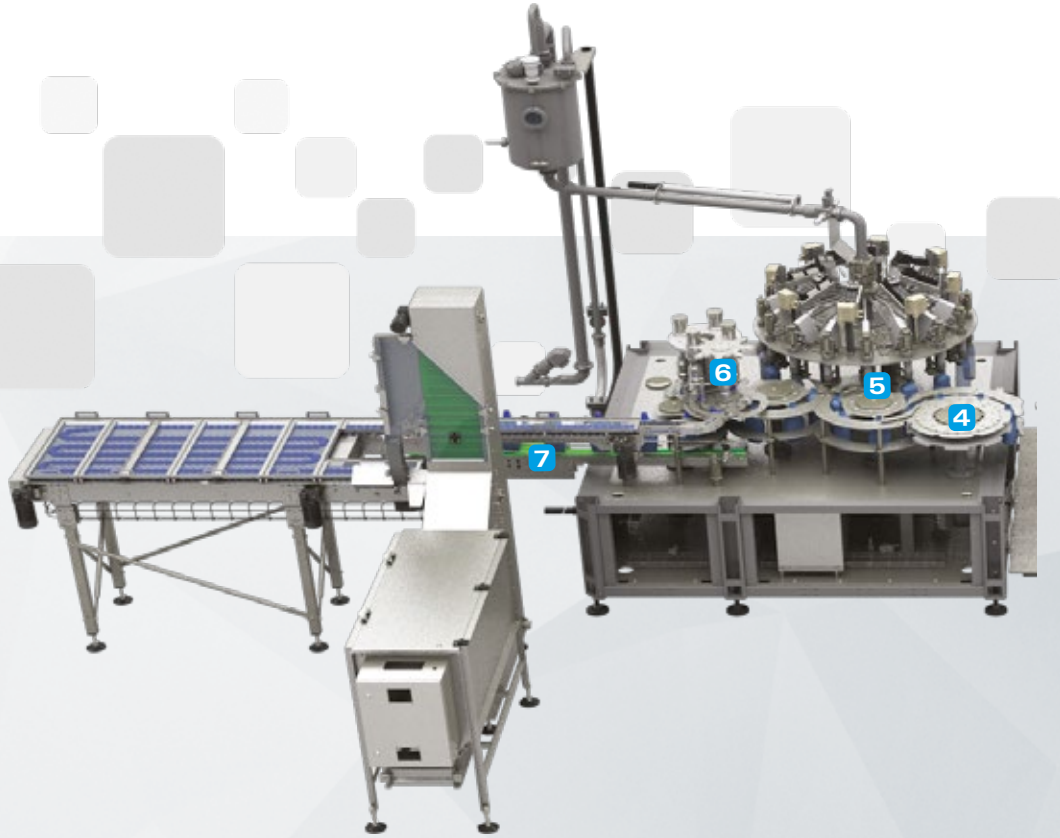
Once the filling station is reached, a gripper grabs the bottle by the neck and places it under the filling valve. The product to be filled is positioned in an external manifold, from which it is conveyed to the filling valve through a specific pump. The electronic volumetric filling process is carried out through electronic flow meters, placed upstream of each filling valve. During the filling process, the flow meter detects the amount of product that goes through the valve. The measurement is based on pulses, that are compared to the ones set for the format in use. When the set value is reached, the closure sign is sent to the filling valve. At this stage the filled bottle is transferred to the capper.

5 HEMF Filling

Once the filling station is reached, a gripper grabs the bottle by the neck and places it under the filling valve. The product to be filled is positioned in an external manifold, from which, through a specific pump, it is conveyed to the filling valve. The filling is electronic with mass flow meters based on Coriolis principle and placed upstream of each filling valve. During the filling process, the flow meter detects the amount of product that goes through the valve. The measurement is based on pulses, that are compared to the ones set for the format in use. When the set value is reached, the closure sign is sent to the filling valve. At this stage the filled bottle is transferred to the capper.

5 HEVS Filling

Once the filling station is reached, a gripper, directly connected with the filling valve, grabs the bottle by the neck and brings it into contact with the filling valve, in order to allow the filling operation. The product to be filled is positioned in a manifold resistant to high pressure, placed inside the filling carousel. In the bottle, in contact with the filling valve, CO_2 is injected in order to take it to the right pressure and have a filling with no froth. The electronic volumetric filling process is carried out through flow meters, placed upstream of each filling valve. During the filling process, the flow meter detects the amount of product that goes through the valve. The measurement is based on pulses, that are compared to the ones set for the format in use. While the product enters the bottle, the CO_2 goes out through the dedicated channel. When the set value is reached, the closure sign is sent to the filling valve. At this point the decompression/ sniff phase starts: a specific channel conveys the pressure left in the bottle to a dedicated manifold that discharges outside the filling section. At this stage the bottle is transferred to the capper.



6 Capping

A shaped star wheel allows to center the bottle under its capping station. The cap coming from the feeding system is picked by a transfer star wheel called “pick and place”. The capping head picks the cap from the star wheels and applies it to the bottle. According to the cap to be applied (plastic screw cap or pressure cap), the capping system can operate by rotation or pressure. The filled and capped bottle is transferred to the outfeed conveyor.

7 Outfeed conveyor

The filled and capped bottles are transferred to a chain conveyor that conveys the bottles outside the machine. This conveyor is equipped with an automatic height adjusting system, that allows to adjust the bottle base according to the bottle height.

HEVF fillers advantages

Maximum filling precision

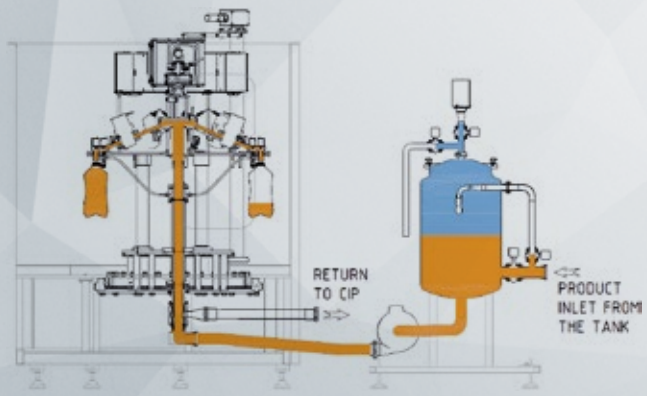
The filling process is extremely precise, thanks to the use of the flow meter, an electronic device installed near each valve that detects the flow of the product that fills each bottle by counting the pulses and sends the filling valve the closure sign, once the value of the format in use is reached.

Compact solution and reduction in transportation costs

The fully welded frame gives the whole machine a solid and resistant structure. This allows a considerable space saving for the machine positioning in the plant. Furthermore, it is possible to transport the filler inside a 40' high cube container (available for most models).

Workability of a wide range of products

A wide range of products can be filled thanks to the valve terminal that is changed according to the type of product.



High level of hygiene

The machine base plate is inclined towards the drainage points. This allows the drainage of liquids that are on the machine base and a higher level of hygiene.

Protection of electronic components

The electric manifold and the drives of the filling valves are isolated from the filling environment through airlocks. This allows to protect electronic components from the contact with liquids and to perform COP washing operations on the whole filling carousel.

Separation between wet and dry manifolds

The entry of the filling product and the return of the washing product take place in the lower part of the machine through a ceramic manifold equipped with two gaskets (one for sealing and one for safety) and equipped with an inspection light. This leads to the neat separation between "wet" manifolds (product and CIP return) and "dry" manifolds (electric and pneumatic), in addition to a high durability.

Fully washable filling valve

Fully sanitized filling valve thanks to dummy bottles with manual or automatic (optional) positioning.

Efficient control of two filling speeds

The valve allows to control two filling speeds in order to fill homogeneously and efficiently, with no product leakage from the container. The duration of the filling cycles (slow or fast) can be controlled easily and intuitively through the recipes inside the man-machine interface (HMI Posyc®).

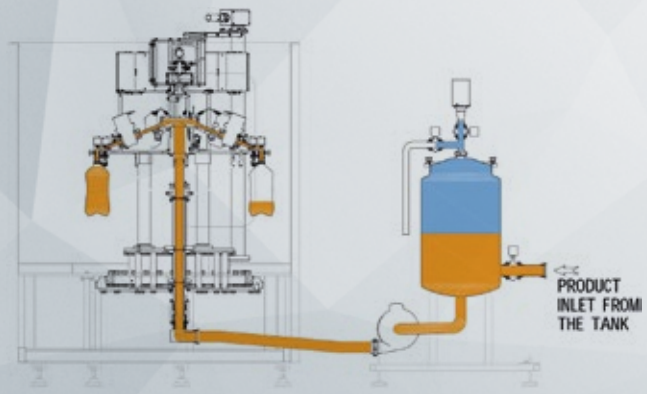
HEMF fillers advantages

Maximum filling precision

The filling process is extremely precise, thanks to the use of the flow meter, an electronic device installed near each valve that detects the flow of the product that fills each bottle by counting the pulses and sends the filling valve the closure sign, once the value of the format in use is reached.

High-precision mass flow meter

The high-precision mass flow meter (flow meter that uses the Coriolis effect in order to determine the exact amount of product at each passage), installed next to the filling valves, allows to get a quick measure with a greater repeatability. The flow meters are characterized by a high stability, with less need for calibration. During the measurement, the impact of the environmental conditions (mechanical vibrations, shaking, sprays, etc) is minimal. Moreover, there is no volume limit (the container size is not limited by the range of load cells). The control of the filling valve and the automatic compensation is performed through PLC.



Simplified filling valve with reduced maintenance costs

Simplified filling valve with a reduced number of gaskets with a significant reduction in costs and times for maintenance operations.

No drop filling valve

HEMF series is equipped with a special no drop filling valve for filling oil in rPET/PET containers, with specific anti-drip function at the end of the filling process.

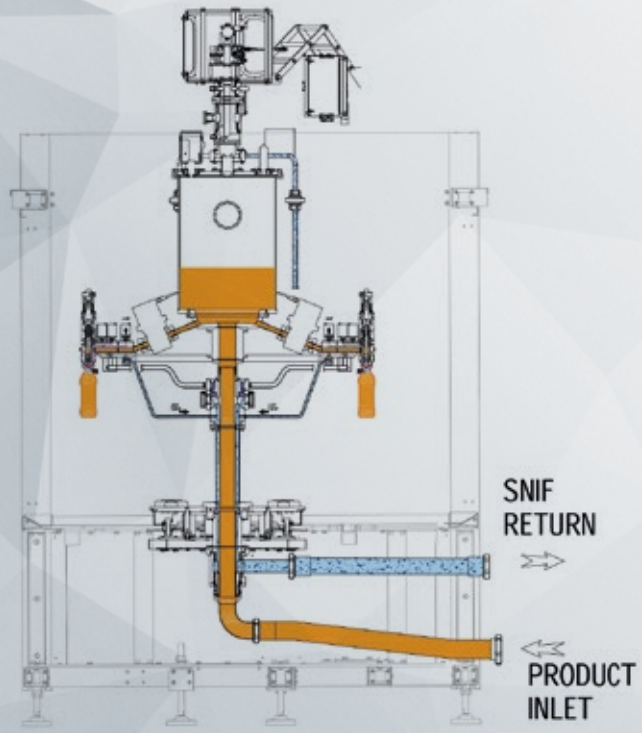
Efficient control of two filling speeds

The valves allows to control two filling speeds in order to fill homogeneously and efficiently, with no product leakage from the container. The duration of the filling cycles (slow or fast) can be controlled easily and intuitively through the recipes inside the man-machine interface (HMI Posyc®).

HEVS fillers advantages

Maximum filling precision

The filling process is extremely precise, thanks to the use of the flow meter, an electronic device installed near each valve that detects the flow of the product that fills each bottle by counting the pulses and sends the filling valve the closure sign, once the value of the format in use is reached.



Compact filling module

The compact filling module allows to minimize the number of transfer star wheels, ensuring at the same time practical access to the machine for maintenance and washing operations.

Cutting-edge filling valve

Filling valve with a high technological content with an independent channel for the passage of CO_2 inside the bottle. Furthermore, the valve terminal allows to divert the product flow to the bottle walls and therefore to reduce the liquid turbulence.

Fully washable filling valve

Fully sanitized filling valve thanks to dummy bottles with automatic positioning.

High precision product tank

The device is equipped with: fully washable and sanitized CO_2 charging/discharging valve; capacitive level probe, that communicates with the modulating valve in product infeed in order to keep the product level in the manifold constant

High level of hygiene and reduction in maintenance times

Filling piston integrated in the valve body ensures less bottle movement, a higher level of hygiene and a reduction in maintenance times.

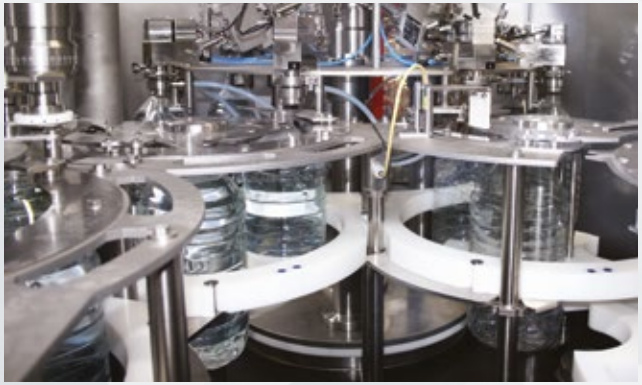
ECOBLOC® ERGON SERIES

ECOBLOC® ERGON
VIDEO
scan this QR code

SMI compact systems from ECOBLOC® range integrate in a single block the functions of a rotary stretch-blow moulder, a rotary electronic filler and a rotary capper. These solutions are ideal for producing, filling and capping containers in rPET/PET and PP with different capacities and shapes, from the simplest to the most innovative and complex. ECOBLOC® range can be used in several sectors: flat and carbonated water, fresh milk, juices, edible oil, vinegar, CSD and detergents. The table on the right shows the possible combinations of stretch-blow moulders and fillers for the creation of ECOBLOC® solutions, according to the product type and the speed (indicated in bph). Combining stretch-blow moulding, filling and capping functions into a single machine offers several advantages, since the rinser and conveyors between the stretch-blow moulder and the filler are not needed, the risks of product contamination are minimized and the causes of the line inefficiency are eliminated.

ECOBLOC®	EBS E	EBS KL	EBS K	EBS HC
HEVF				
STILL WATER	50.000 bph	25.000 bph	10.000 bph	7.200 bph
VINEGAR	50.000 bph	25.000 bph	10.000 bph	7.200 bph
DETERGENTS	50.000 bph	25.000 bph	10.000 bph	7.200 bph
JUICES	50.000 bph	25.000 bph	10.000 bph	7.200 bph
FRESH MILK	48.000 bph	25.000 bph	10.000 bph	7.200 bph
HEMF				
EDIBLE OIL	36.000 bph	25.000 bph	10.000 bph	5.400 bph
HEVS				
CARBONATED WATER	40.000 bph	25.000 bph	10.000 bph	-
CSDs	38.000 bph	25.000 bph	10.000 bph	-

*The stated values are not binding, as they have to be confirmed by SMI according to production conditions and preform/container technical specifications.



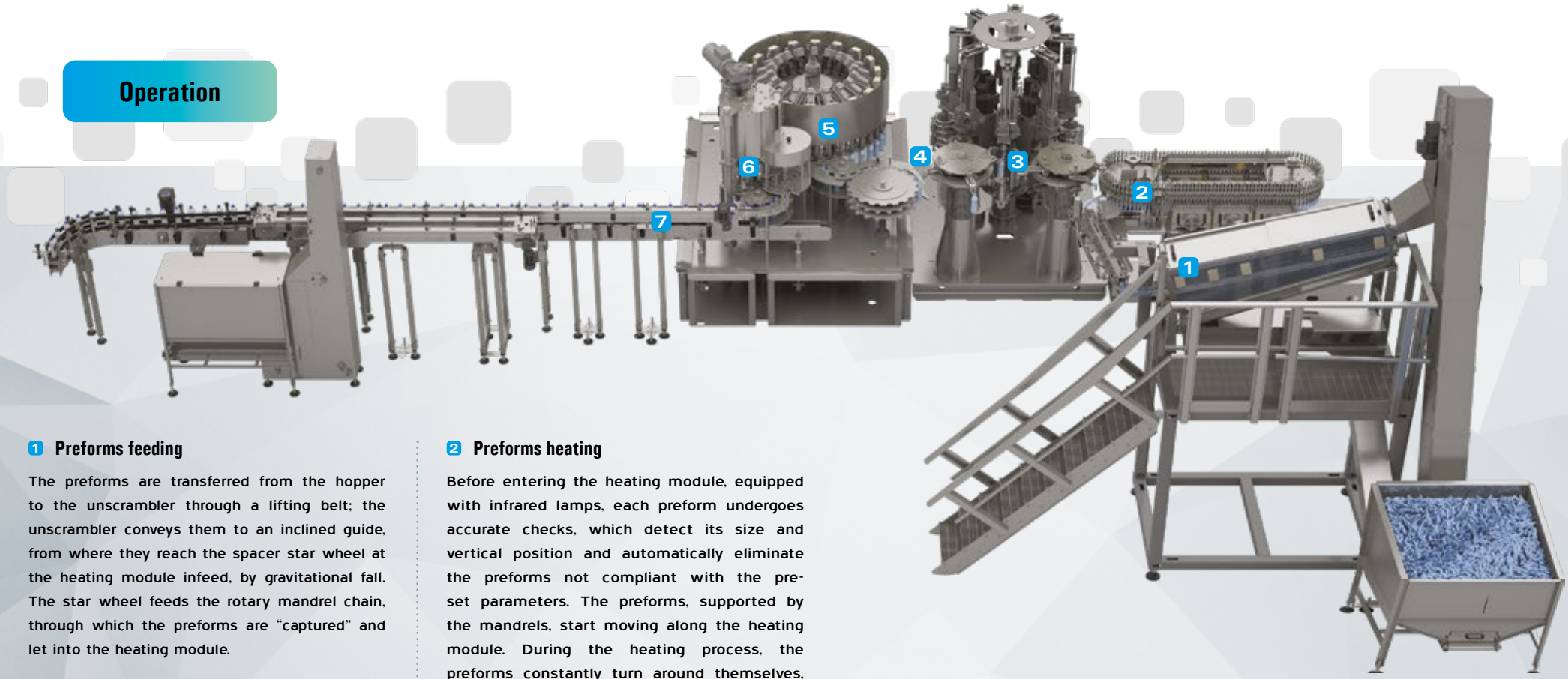
Main features and benefits

- Modular and compact structure with a wide possibility of customization and limited number of transfer star wheels
- Perfect separation between the stretch-blow moulding module of the "dry area" and the filling one of the "wet area"
- Motorization in the machine lower part
- "Neck handling" direct bottle transfer by means of adjoining star wheels
- Low running, energy and maintenance costs
- High level of hygiene and cleanliness

Eco-sustainability and energy saving

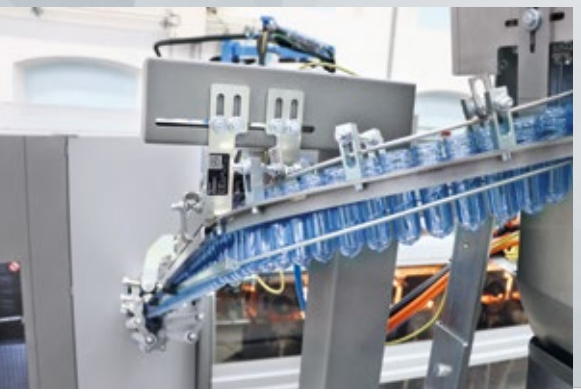
- Air Master compressed air recovery system, mounted as standard equipment on the stretch-blow moulder, allows to:
  - Reduce HP compressed air in pre-blowing and blowing times
  - Reduce LP compressed air for utilities
  - Reduce the consumption of electric energy (reduced use of the compressor)
- Lower consumption of electric energy, thanks to:
  - Lower number of operating motors between the stretch-blow moulder and the filler
  - Use of digitally controlled asynchronous motors only
  - Use of IR lamps only: the use of heat reflective panels made of a highly energy efficient ceramic material installed in front of and behind the lamps increases the intensity of thermal radiation and so energy consumption is considerably reduced

Operation



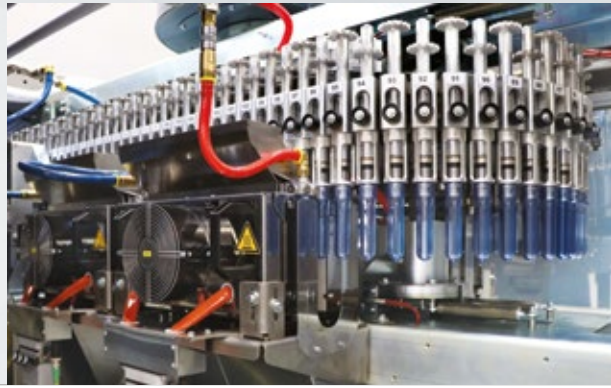
1 Preforms feeding

The preforms are transferred from the hopper to the unscrambler through a lifting belt; the unscrambler conveys them to an inclined guide, from where they reach the spacer star wheel at the heating module infeed, by gravitational fall. The star wheel feeds the rotary mandrel chain, through which the preforms are "captured" and let into the heating module.



2 Preforms heating

Before entering the heating module, equipped with infrared lamps, each preform undergoes accurate checks, which detect its size and vertical position and automatically eliminate the preforms not compliant with the pre-set parameters. The preforms, supported by the mandrels, start moving along the heating module. During the heating process, the preforms constantly turn around themselves, so as to ensure an excellent and symmetrical heat distribution. The heating module is equipped with two different cooling systems: a liquid-fed cooling system, in order to cool the protection ring preventing the preforms thread deformation during the heating process; an air-fed cooling system, in order to keep the temperature inside the heating module as low as to avoid the exposure of the preforms outside walls to too high temperatures. At the heating module outlet, a sensor detects the preform temperature and compares it with the temperature set point; if the two values do not correspond, it increases or decreases the heating module lamps power.



3 Preform stretch-blow moulding

A special rotary group of grippers picks up the preforms from the oven and sets them into the stretch-blowing stations. The stretch-blowing process includes two phases:
- stretching and pre-blowing, which occur simultaneously through the descent of the motorized stretching rod and the supply of low-pressure compressed air;
- final blowing with high-pressure compressed air, through which the containers take their final shape. A counter-pressure air system ensures the perfect locking of the moulds, whereas the mechanical locking of the mould-holders allows bearing the strengths generated by the stretch-blow moulding process with the maximum reliability. Also the stretch-blowing stations are equipped with a liquid-fed cooling system, which keeps the moulds temperature constant.

4 Empty bottles transfer

After being manufactured by the stretch-blow moulding machine, empty bottles are conveyed from the blower to the filler by "neck-handling" direct transfer by menas of adjoining star wheels. The star-wheel at the blow moulder outlet is equipped with grippers electronically synchronised with the brackets of the starwheel at the filler inlet.

5 Filling

Filling takes place according to the product to be filled and the type of combined filler. At this stage the filled bottle is transferred to the capper.

6 Capping

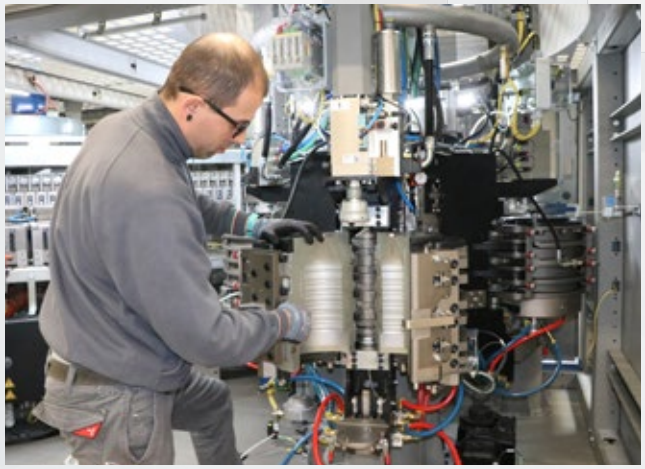
A shaped star wheel allows to center the bottle under its capping station. The cap coming from the feeding system is picked by a transfer star wheel called “pick and place”. The capping head picks the cap from the star wheels and applies it to the bottle. According to the cap to be applied (plastic screw cap or pressure cap), the capping system can operate by rotation or pressure. The filled and capped bottle is transferred to the outfeed conveyor.

7 Outfeed conveyor

The filled and capped bottles are transferred to a chain conveyor that conveys the bottles outside the machine. This conveyor is equipped with an automatic height adjusting system, that allows to adjust the bottle base according to the bottle height.

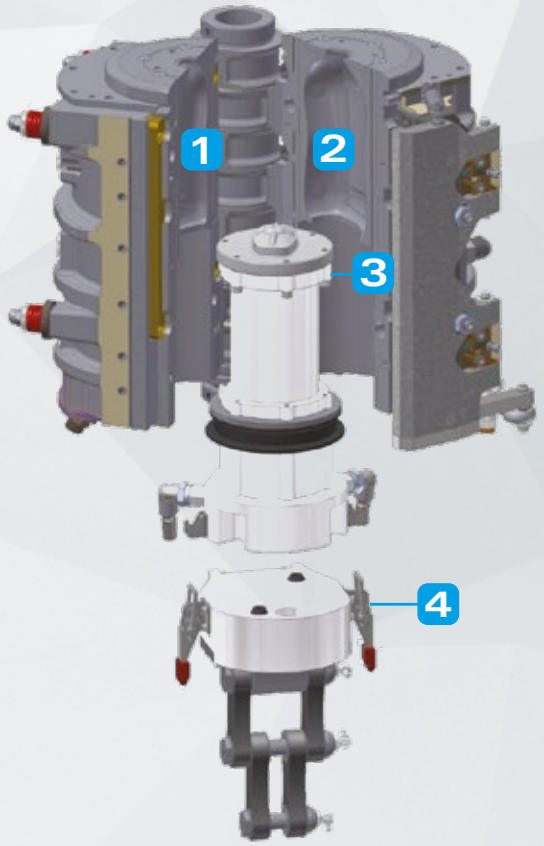
Changeover

Thanks to their flexibility, SMI rotary stretch-blow moulders are the ideal solution to produce a wide array of containers with one machine model. Large vertically-sliding doors provide easy access to the machine components and to the moving organs from two sides. Low changeover times allow to re-start production immediately. The parameters for each container are stored in the POSYC® control panel, ready to be selected by the the operator from the touch screen display. The mechanical adjustments, the replacement of the moulds and of any other component, if necessary, require few minutes and can be carried out by using the set of tools supplied with the machine.



Moulds replacement

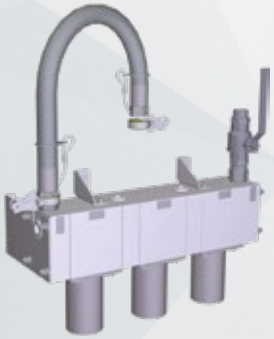
The changeover procedure consists of a few simple operations: opening of the mould-holder (1), removal of each half-mould (2) by loosening three screws, change of the mould bottom (3) by means of a mechanical hook (4) driven by a mechanical device (5), replacement of the stretching rod lock and selection of the new type of container from the POSYC® control panel.



» PREFORMS AUTOMATIC LOADER

It allows to considerably reduce the loading time; in a few seconds, in fact, it is possible to load up to 2 pallets of preforms (depending on the blow moulder model).

» THREE STERIL FILTERS FILTRATION UNIT

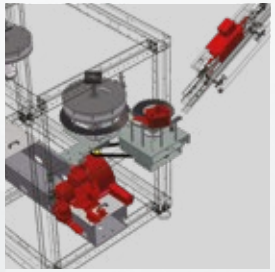


The high-pressure air used in the stretch-blowing process of plastic containers (rPET/PET, PP, etc.) must comply with certain quality standards to allow pneumatic devices to work properly and to safeguard the equipment efficiency and integrity during its entire life cycle.

The filtration unit is composed of a metal "bar" to which three filter-cartridges containers are fixed, in order to provide three filtration stages:

1. coalescing pre-filtration: for the removal of solid particles, water and oil;
2. active carbon filtration: for the removal of odors and oil vapors;
3. final filtration for sterile air.

» SUCTION OF THE SPACING STAR WHEEL



In any bottling line, the hygiene of the product and of the container is crucial.

Thanks to the installation of a special spacing star-wheel, the preforms undergo an accurate cleaning process before entering the heating module.

Special nozzles remove any residual dust or microscopic particles from inside the preforms.

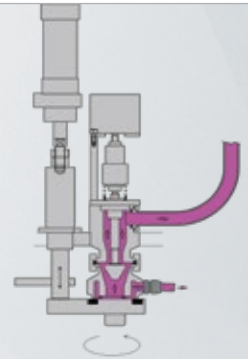
» MOULD STORAGE TROLLEY AND SET OF TOOLS FOR EXTRAORDINARY MAINTENANCE

In order to make changeover and extraordinary maintenance operations easier and quicker, SMI can supply a set of tools and a mould storage trolley, with a capacity of up to 15 moulds on EBS E machine models and up to 4 moulds on EBS KL HC models.

» CHILLER

In order to cool the heating module and the blowing wheel, SMI offers different models of air coolers, suitable for indoor installations.

» AUTOMATIC DUMMY BOTTLES SYSTEM



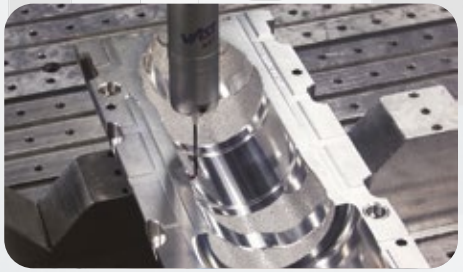
ECOBLOC® integrated systems feature – as an option – a device for the automatic insertion of dummy bottles during the machine sanitization and cleaning process (CIP).

The bottles are lifted, screwed to the filling valve and discharged at the end of the cleaning cycle; such system prevents any contact between the operator and the machine, staving off the relevant product contamination hazards.

The process automation allows as well to drive down CIP operation times.

» "REDUXAIR" SYSTEM

The "ReduxAir" system allows to carry out stretch-blow moulding operations at lower pressures than usual (around 40 bars).
By an innovative design and specific technical solutions this system allows the air in between the bottle outer walls and the mould surface to be more quickly released; thus, the rPET/PET bottle manufacturing process can be carried out with compressed air pressure at 15-20 bars (such a value depends on the preform and bottle features and on the stretch-blow moulding process conditions).
The great advantage the ReduxAir's user can benefit from in terms of lower power consumption of the compressor requires a few design limitations in the bottle shape and features.



» Design of the containers

SMI relies on an advanced 3D CAD Department for the design and graphic processing of the bottles.

After an accurate analysis of the customer's requests, the container idea is developed and turns into a detailed project.

Up to now, SMI engineers have designed over 1,700 different containers, featuring from the most simple to the most sophisticated shape.

» Mould production

The moulds mounted on SMI stretch-blow moulders are made of a special aluminium alloy and are manufactured by Smimec, a company equipped with an FMS line consisting of 12 CNC machining centres: highly automated machines, running 7 days a week round the clock, even without the operator according to pre-set production programmes (CAM).

The 12 machining centres can achieve an output of more than 15,000 moulds per year; they are equipped with linear motors with a speed rate up to 80 meters per minute and mandrels achieving a speed rate of 30,000 rounds per minute.

As a result, top-level quality standards are constantly provided.

» Preform checks

In a state-of-the-art laboratory, equipped with sophisticated technologies, the customer's preforms are accurately tested before entering the stretch-blowing unit.

In particular, the preforms size is checked by a videocamera, while a special software for the comparison of dimensional parameters measures the preform walls thickness by means of short-wave infrared rays and checks the polymer homogeneity by means of polarized light equipment.

SMI constantly invests in research and development activities, such as testing new materials and applications, especially multi-layer or hot-filling preforms.

» Container tests

All the containers produced by the stretch-blow moulder are tested to check their mechanical- thermal features, that is:

- top load
- drop impact resistance
- resistance to deformations
- thermal stability
- homogeneous distribution of the resin
- burst pressure
- stress cracking

» In SMI blow moulders and fillers, the fully automatic processes, the electronically-controlled and the wiring by fieldbus are synonyms of reliability, considerable operational flexibility and high performance. The hardware and software components are "open" and modular, in compliance with the most important international certifications and rely upon consolidated standards of the industrial field and of the packaging sector: OMAC guidelines (Open Modular Architecture Controls), sercos, PROFIBUS, IEC61131, OPC, Industrial PC. In particular, by following the OMAC guidelines and the Omac Packaging Workgroup (OPW), SMI can guarantee easy integration with the other machines in line, user-friendly technology and maintenance of the investment value. Moreover, SMI systems comply with the technical requirements of Industry 4.0 and IoT (Internet of Things) technologies, which allow to easily and effectively run production lines within a "Smart Factory", even remotely through mobile devices. The automation and control system of SMI machines, called MotorNet System®, includes the following hardware components: MARTS (process controller), POSYC® (man-machine interface), COSMOS (digital servodriver for brushless motors), dGATE and aGATE (remote IP65 I/O digital/analogic modules). The MARTS is a PAC (Programmable Automation Controller), based on an industrial PC, which can be programmed in IEC61131 languages. The COSMOS servodrivers and the dGATE/aGATE I/O modules are connected to the PAC via sercos . The POSYC® is a HMI terminal, (touch screen IP65), based on an industrial PC with solid state drives.

MotorNet System®

SMI stretch-blow moulders are very easy to use; in fact, thanks to the MotorNet System® technology, it is possible:

- To set the heating profile for each preform and the parameters influencing the phases of the stretch-blowing process (from when the preform enters the heating module up to the container);
- To adjust the power of each lamp in each section of the heating module;
- To control the operation parameters of each stretch-blowing station and monitor the whole stretch-blowing process in real time;
- To store the parameters of each container blown;
- To check and set the machine production speed, according to the different types of containers;
- To change format quickly and easily;
- To solve or prevent any problems, thanks to the teleservice, the graphic alarms displayed on the POSYC® and the signal of the maintenance interventions to be carried out;
- To have direct access to the manuals on the HMI POSYC®;
- To ensure high outputs, excellent quality and low noise levels;
- To monitor the performance and analyse the down-times (Pareto diagram);
- To interchange the POSYC® with compatible Panel PC;
- To interchange the COSMOS with compatible sercos pack profile servodrivers.

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