SFL

Linear Blowmolding Machines

SIPA

360° PLASTIC CONTAINER MANUFACTURING EXPERTIZE

The state of the art of linear blow moulding technology

Containers

Materials: PET, OPP, PLA, Multilayer

Type

- Standard and personalised
- Lightweight
- Hot filling
- Pasteurisable
- Ultra-Clean
- Large sizes (up to 12 litres)
- Oval and off-center neck

- Light barrier
- Gas barrier
- Humidity barrier
- Active packaging

Applications

- Mineral water
- Soft drinks
- Fruit juices
- Sports drinks
- Functional drinks
- Tea, coffee
- Milk and milk-based products
- Edible oils
- Beer and spirits
- Dressings and sauces
- Cosmetics and detergents

The new SFL linear blow moulding machines offered by SIPA are the only highly flexible systems present on the market.

Packaging solutions

Extensive experience. During the last 30 years, SIPA has gained a wide range of experience in the development and optimisation of bottles and preforms and over these years it has designed thousands of containers for a multitude of applications, from drinks to food, cosmetics, detergents and pharmaceutical products.
SIPA is able to support its customers by offering the preform and container solution which best suits the customer's specific needs, from the design and supply of samples up to quality certification. SIPA's container prototype department is equipped with two-stage and single-stage unit-cavity machines and a laboratory for the quality certification of the products which is fully equipped to perform all the tests normally required on preforms and containers - including dimensional analyses and mechanical, chemical and physical property tests (e.g. AA, gas permeability) - as well as filling simulations.

Complete solutions. Over the years, SIPA has developed both single-stage and two-stage technologies for a wide range of applications, implementing turn-key industrial plants and acquiring a thorough knowledge of production processes. The company is able to guarantee the functionality and optimisation of the packaging as a whole: preform, container, closure, label, packaging and palletising.

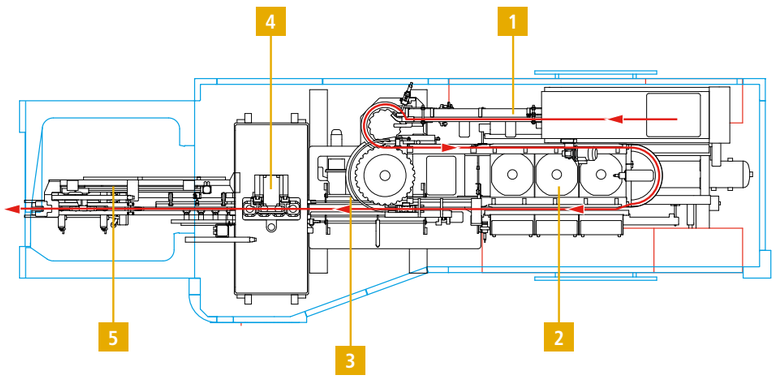
The versatility of the SFL. The innovative SFL linear blow moulding machine platform provides great flexibility in the production of a vast range of different types of containers.
Numerous systems which are already in production have confirmed the special characteristics of this new technology.
The SFL range can produce standard and personalised bottles for standard filling, for hot filling, oval bottles with shaped necks and multilayer bottles, lightweight bottles, small containers for the pharmaceutical industry as well as large containers up to 30 litres, and all this at high production rates. In fact this technology guarantees the highest productivity per cavity with respect to the other linear platforms present on the market, at speeds equal to rotary blow moulding systems.

Innovative design for excellent performance

Models	Blowing cavities	Maximum size (l)	Output* (b/h)
SFL 6/6	6	3	up to 9,600
SFL 6/4	4	5	up to 5,000
SFL 6/3	3	10	up to 3,300
SFL 6/2	2	12	up to 2,200
SFL 4/4	4	3	up to 7,200
SFL 4/3 XL	3	5	up to 3,750
SFL 4/2 XL	2	12	up to 2,200
SFL 2/2	2	25	up to 1,200
SFL 2/1	1	30	up to 500

* The above figures are indicative and they must be confirmed by the Technical Department for specific applications

A number of innovative technical configurations are available for a wide range of applications at high productivities (up to 1,800 b/h/c).



The SFL range

The range consists of 3 basic platforms: SFL 4, SFL 6 and SFL 2 which have a high level of standardisation of the components for all models and configurations, from 1 to 6 cavities. Platform SFL 6 is available in 3 configurations: SFL 6/6 (6 blow cavities) for the production of containers up to 3 litres; SFL 6/4L (4 blow cavities) for containers up to 8 litres and SFL 6/3L (3 blow cavities) for containers up to 10 litres. Platform SFL 4, with a maximum production of 1,800 b/h/c, is available in 3 configurations: SFL 4/4 for containers up to 3 litres; SFL 4/3L for containers up to 5 litres; SFL 4/2 for containers up to 12 litres. The SFL 2, for the production of large containers features 1 cavity for container productions up to 30 liters and 2 cavities for containers up to 25 liters.

1 Preform feeding. Preform feeding in bulk via belt elevator, linear unscrambler and gravity feeding with in-feed star-wheel for loading on chain spindles. Space has been optimised by placing the linear unscrambler and the gravity feeding inside the machine cabin. As in the rotary blow molding machines, the oven chain is made of injected composite technopolymers so it is light weight, lubrication and maintenance free.

2 Preform heating. Preforms enter the oven, neck up. Thanks to a very efficient oven cooling and cross ventilation system, necks and spindles are protected against overheating while preform surface is perfectly cooled to avoid crystallisation even for thick preforms and high production rates.

3 Preform transfer. After heating, preforms leave the oven and are transferred to the blow moulding station by means of a variable pitch unit operated by a servo motor.

4 Stretching and blowing. As is used for the rotary blow moulding machines, monoblock valves are used for pre-blow, blow and discharge thereby guaranteeing fast, precise and repetitive adjustment of the blow settings. The stretching also uses a servo motor, thereby considerably increasing the flexibility of the blow process.

5 Bottle ejection. Once the bottles have been blown they are transferred outside the blowing mould and transferred by a simple mechanical system. The bottles may be discharged on air conveyors, dropped in bulk or discharged onto a table top conveyor.

Fast, simple, versatile

SIPA's goal in the development of this new range of linear blow moulding machines was to create a simple and extremely versatile technology which is able to provide the customer with the highest performance compared to the linear blow moulding machines available on the market while maintaining an excellent container quality.

High production

Using unique and patented technology, the SFL achieves high production outputs and excellent container quality. The mechanical operation, which is completely electrical, leaving more time available for the stretch-blow molding process. The efficiency of the oven heating and ventilation does not impose thermal conditioning limits on the preforms. The system for the blow molding distribution and adjustment benefits from SIPA's experience in the design and manufacture of high speed rotary blow moulding machines. The electrical stretching gives precision and flexibility to the process and guarantees full repeatability.

Low energy consumption

The adoption of a fully electrical operational system, which is fast and precise, guarantees the maximum energy savings.
In order to reduce the air consumption for blow molding, we have adopted the same air supply and recovery circuits and monoblock valves that are used on our rotary blow molding systems.
The oven for the thermal conditioning of the preforms ensures their perfect conditioning with lower operating temperatures and more efficient ventilation. This results in significant energy savings and a considerable flexibility in the adjustment of the heating-stretching-blowing process.

Versatility

All models of the SFL series can produce a wide range of containers, from 0.10 litres up to 12 litres. The production versatility and flexibility enables quick and simple changing from one format to another. The system for gripping the preforms enables the type of neck to be changed (from 28 mm up to 48 mm) with simple operations and without the use of tools and adjustments. The gripping system also minimises the number of personalised parts.

Compactness

The SFL linear blow moulding machine has a compact layout and a small overall size. The preform linear unscrambler and the gravity feeding are nested inside the machine cabin. The traditional preform feed hopper is a separate component which may be installed either next to the cabin, on three possible sides, or in a remote position. Its size and installation flexibility make the SFL suitable even for installation in very small rooms.

Cleaning

The fully electrical operation, the non-lubricated oven chain, the blow clamp equipped with self-lubricating graphite bearings and the electrical stretching are all elements which contribute towards keeping the inside of the machine clean. This results in limited maintenance requirements, energy savings and a high quality of the containers.

Innovative solutions, high performance

The new range of SFL linear blow moulding machines incorporate a series of innovative technical solutions, many of which are based on technologies developed by SIPA for rotary blow moulding machines. The SFL represents the new state of the art for linear blow moulding machines in terms of performance and reliability.

Preform feed system

- The preform feeder unit consists of a star feeder (based on the SFR rotary blow moulding machines) which is extremely reliable and may be easily replaced for neck changes.
- The feed system is continuous.
- Quick change for personalisations, guides and stars. Adjustments not required.

Transport of preforms inside the ovens

- Continuous oven feed with oven chain made of composite techno-polymers requires no lubrication. Equipped with quick-change spindles.
- Chain pitch 60 mm for necks up to 48 mm.

Preform heating and oven ventilation

- Innovative ventilation system with air flow perpendicular to the preforms and transversal to the lamps, resulting in perfect cooling of the surface of the preforms and the lamps, and excellent cooling of the preform neck.
- Preform heating is almost exclusively by radiation and therefore the working temperatures of the oven are extremely low. This ensures fast start up times and large processing windows.
- Modular design of ovens.
- Ovens sized to produce bottles up to 30 litres (set up for 16 lamps).
- Independent and adjustable chain electrical drive (brushless motors) thus adjusting the heating time required for the specific application.

Transfer of preforms and bottles

- Servo-driven Pitch-Change preform transfer.
- Servo-driven Unit for transfer of preforms to blow moulding press and unloading bottles.
- Rapid change of preform personalised parts requires no adjustments.

Blow Press

- Driven by brushless motor (continuos running) synchronised with oven chain brushless drive motor and perform/bottle transfer brushless drive motor.
- Transformation of the continuous movement of the brushless motors to discrete movement of the press by means of patented gearbox and transfer mechanisms. This results in a smooth press movement.
- High press opening and closing speed (opening time = 0.22 second and closing time = 0.22 second at 1,800 b/h/c).
- Toggle clamp with self-lubricating graphite bearings (clean and maintenance free).
- Compensation of the blow pressure by means of twin pneumatic membranes (one for each press plate).

Stretching-blowing

- Stretch rods operated by a servo motor which are able to guarantee, above all, adjustment of the desired speed and position for the specific application at a high level of repeatability.
- Blow seals based on our rotary technology, which are fast and independent for every cavity.
- Eugen-Size monoblock blow valves are also used on the rotary blow moulding machines and are independent for every cavity. They guarantee the fastest response and the best repeatability.
- Control of the blow profile for every cavity by means of pressure transducers in the cavities displayed graphically on the operator interface panel.

Bottle discharge unit

- Servo Driven and sychronised with press and oven movements.
- Interface to air-conveyor, table-top conveyor or bulk discharge.

Automation and operator interface module

- Beckhoff industrial PC with software developed by SIPA.
- Siemens electrical-electronic components and communications by Profibus and optical fibres.
- Touch screen graphics interface with access to and storage of all the parameters for machine control and heating and blow molding process, alarms and diagnostics, production statistics, maintenance procedures and video, manuals and spare parts lists.
- Modem connection with SIPA customer support service.

Eeasy to use, reliable, low maintenance

The SFL linear blow moulding machines have been designed for extremely easy use and enable very simple mould and configuration changes. They are reliable systems with reduced maintenance time and costs.

Operator interface

The automation and control of the system is carried out by means of a touch screen graphical interface with access to and storage of all the parameters for machine control, heating-blow molding process, alarms and relative diagnostics, production statistics, maintenance procedures and video, manuals and spare parts lists. It also provides a modem connection with the SIPA On-Line Teleservice for customer support.

Mould change

The SFL blow moulding machines enable the mould to be changed quickly and easily.
There is an accessible area at the front of the machine for changing the molds, with the extraction of the monoblock mould on a simple roller (for 2 and 6 cavities, for small and large containers). The change of personalised parts, which is necessary in the event of a neck change, requires the replacement of all the quick fit elements, such as in-feed star wheel, chain spindle transfer grippers and seals. The aligner and the preform gravity chute are the only adjustments required. It is all easily accessible by the operator at the various parts of the machine.

Configuration change

A change of configuration of the SIPA SFL blow moulding machine from, for example, a 2 cavity configuration for the production of 12 litre containers to a 4 cavity configuration for 1 litre containers, is very simple and fast and may be performed by the machine operators in just few hours.

Low maintenance costs

The time and costs required for routine maintenance of the SFL blow moulding machines (cleaning, wear, adjustments) are very limited due to the fully electrical operation of the machine, the configuration of the oven chain which does not require any lubrication or greasing, the blow press equipped with self-lubricating components (graphite bearings), the electrical stretching, the use of high quality and standardised electrical and electronic components, the easy use of the machine and the direct access to all its parts.

Quick Testing, Delivery, Installation and Start up

All the SIPA machines are fully assembled and tested at the factory in Vittorio Veneto (Italy) and they are shipped together with the certificate of conformity and the test certificates in a fully assembled condition (including cabin). All the blow moulds are tested at the SIPA factory prior to shipment and the blow process parameters are stored and certified. The machines may be shipped complete in a single container and they may be easily positioned on site by means of a crane or a forklift truck. This enables quick positioning and start up.

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