



SFL

Linear Blowing Systems

SFL

Linear Blowing Systems

SIPA S.p.A.
Via Caduti del Lavoro, 3
31029 Vittorio Veneto (TV) - ITALY
Tel: +39 0438 911511
Fax: +39 0438 912273
E-mail: sipa@zoppas.com
Website: www.sipa.it

SIPA FILLING & PACKAGING DIVISION
Via Provinciale, 36
43038 Sala Baganza (PR) - ITALY
Tel: +39 0521 548111
Fax: +39 0521 548112
E-mail: sipa@zoppas.com
Website: www.sipa.it

SIPA NORTH AMERICA
4341 International Parkway
Suite 110
Atlanta, Georgia 30354 - U.S.A.
Tel: +1 404 3493966
Fax: +1 404 5745568
E-mail: sales.northamerica@zoppas.com

SIPAMERICAN INDUSTRIES
ZOPPAS TOOLS & MACHINERY S.A. DE C.V.
Circuito Mexico 120
Parque Industrial Tres Naciones
San Luis Potosi S.L.P. CP 78395 - MEXICO
Tel: +52 444 8047400
Fax: +52 444 8047499
E-mail: sipamerican.industries@zoppas.com

SIPA ANDINA Ltda
Avenida El Dorado 68 C 61
Oficina 628, Piso 6
Bogota - COLOMBIA
Tel: +571 479 5252
Fax: +571 476 3444
E-mail: sipa.andina@zoppas.com

SIPA SUL AMERICA Ltda
Wt Empresarial Parque
Av. Gupê, 10.767 - Galpão 08 Bloco II
Jardim Belval
06422-120 Barueri - SP - BRAZIL
Tel: +55 11 47728300
Fax: +55 11 47728301
E-mail: sipa.sulamerica@zoppas.com

SC SIPA ENGINEERING ROMANIA S.r.l.
Str. Mangalia, 61
300186 Timisoara - ROMANIA
Tel: +40 356 434200
Fax: +40 356 434280
E-mail: sipa.romania@zoppas.com

SIPA TURKEY
SIPET A.Ş.
SITKI BEY PLAZA - Atatürk Caddesi No: 82/1
19 Mayıs Mahallesi - Kat:13 Daire:34
34736 Kozyatağı - Kadıköy - İstanbul - TURKEY
Tel: +90 216 474 9780
Fax: +90 216 474 9779
E-mail: SipaSalesTr@zoppas.com

SIPA UKRAINE
Office 37, 9 Turovs'ka St., Kyiv
04080 Kiev - UKRAINE
Tel: +380 (44) 4636645
Fax: +380 (44) 4257275
E-mail: office@sipa.kiev.ua

SIPA RUSSIA
Ul. Ordzhonikidze, 11 Str. 1/2
115419 Moscow - RUSSIA
Tel: +7 495 232 4191
Fax: +7 495 232 4190
E-mail: siparussia.office@zoppas.com

SIPA SOUTH AFRICA
12th Floor, Metropolitan Building
7, Coen Steytler Avenue
Cape Town 8001 - SOUTH AFRICA
Tel: +27 (21) 418 2750
E-mail: sipa.southafrica@zoppas.com

SIPA MIDDLE EAST LLC
Office n. 807 - Arenco Tower
P.O. Box 214525, Dubai Media City
Dubai U.A.E.
Tel: +971 4 3754607
Fax: +971 4 4230636
E-mail: SipaME@zoppas.com

SIPA INDIA
B 101, Mangalya
Off Marol Maroshi Road
Marol, Andheri (East)
Mumbai - INDIA 400 059
Tel: +91 22 29201785
Fax: +91 22 29201795
E-mail: sipa.india@zoppas.com

SIPA THAILAND
3rd Floor, MSC Building, 571, Sukhumvit 71 Rd.,
Klongton - Nua, Vadhana
Bangkok 10110 - THAILAND
Tel: +662 713 0973-5
Fax: +662 713 0976
E-mail: sipa.fareast@zoppas.com

SIPA CHINA
19/F, unit 1905, Zhong Yu Plaza,
No. jia-6 Gongtibi Road, Chaoyang District
100027 Beijing - CHINA
Tel: +86 10 65120447-48
Fax: +86 10 65120449
E-mail: sales.china@zoppas.com

SIPA MACHINERY HANGZHOU
3 Road 14, Economic & Technology Development Zone
310018 Hang Zhou, Zhejiang province - CHINA
Tel: +86 571 86913106
Fax: +86 571 86913548
E-mail: sales.china@zoppas.com

SIPA JAPAN Ltd.
Cent-Urban Bldg. 604, 3-23-15, Nishinakajima,
Yodogawa-ku, Osaka 532-0011 - JAPAN
Tel: +81 6 4862 4801
Fax: +81 6 4862 4803
E-mail: tanigaki@sipajapan.com



Zoppas Industries

Feel free to imagine. We make it happen.



gruppo rem

C05_r0_13

Pictures and technical data are correct as time of publication, however may be subject to change without advise.

The state of the art of linear blow moulding technology

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

Packaging solutions

A unique expertise

During the last 25 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.

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.

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.

- **3 Machine versions:**
Standard Bottle, Large Size, Wide Mouth
- **6 Special kits for:**
Preferential Heating, Neck Orientation, Heat Set, Handle Insertion, Long Neck, OPP.
- Flexible configuration (small bottle, max cavitation - large bottle, lower cavitation)
- Bottles volume from 200ml up to 30 liter
- Neck finish from 26 mm up to 130 mm

Containers

Materials:
PET, OPP, PLA, Multilayer

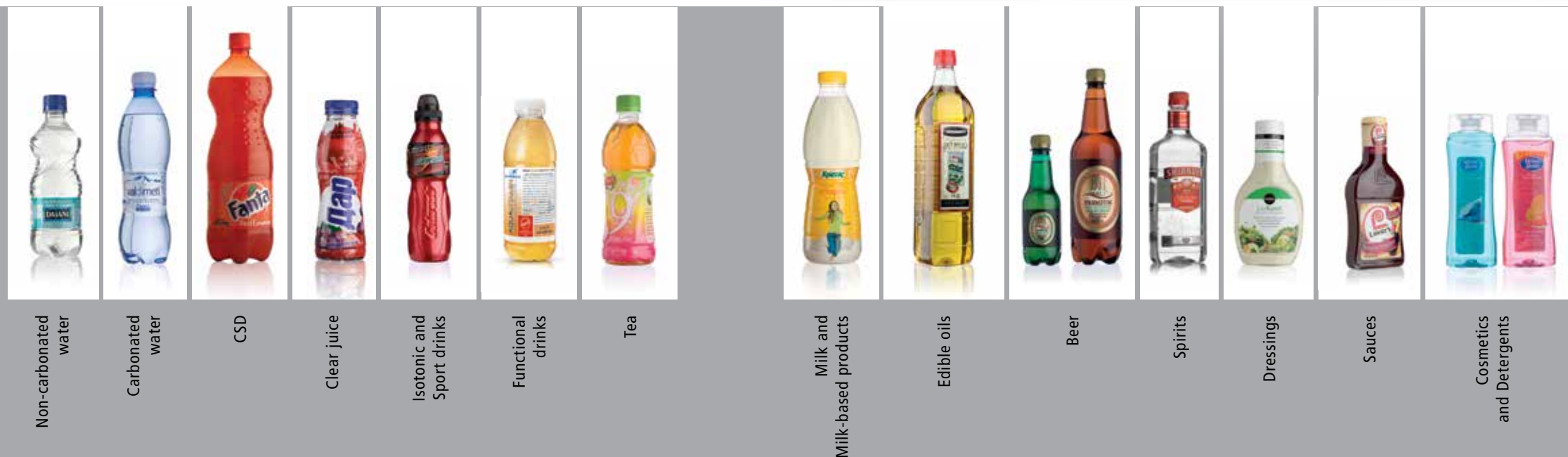
Type

- Standard and personalised
- Lightweight
- Heat Set
- Pasteurisable
- Ultra-Clean
- Large sizes (up to 30 litres)
- Oval and off-center neck
- Wide mouth (jars)

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



Applications



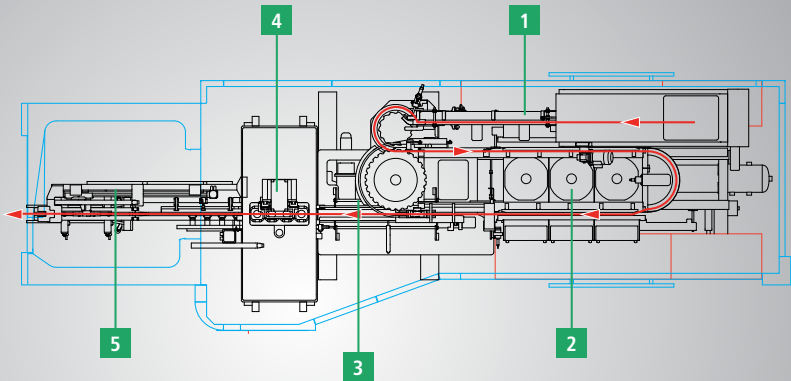


Innovative solutions, high performance

A number of innovative technical configurations are available for a wide range of applications at high productivities. The SFL represents the state of the art for linear blow moulding machines in terms of performance and reliability.

Mean Features:

- High Output, up to 1,800 bottles/hour/cavity
-7,200 bph SFL4/4
-10,800 bph SFL6/6
- Fully electric machine
- High standardisation
- Great versatility
- Extremely quick installation and start-up time (machine cabin installed before shipment)
- User friendly technology with full process control



Process steps: main features & benefits



1 Preform feeding & handling

- Continuous preform feeding system
- Proper preform stabilization time on star-wheel before spindle insertion
- Composite techno-polymers chain: very light, no wear, no elongations, low maintenance cost
- Self-lubricate bushing and sealed bearing
- Standard quick changeover of spindle (tool-less)
- Different chain pitch to optimize production based on specific neck finish diameters
- Ejection system for oval or not well inserted preforms
- Quick-change system (option) in less than 5 minutes for different neck diameters: change of loading wheel and loading guides

2 Preform heating

- Preform heating system with laminar flow (SIPA patent). No turbulence
- Low thermal inertia: higher heating process consistency and fast start-up
- Oven dimensions based on preform and max bottle size (from 8 to 16 lamps)
- Modular oven
- Adjustable position for neck change

3 Preform transfer & pitch change

- Servo-driven pitch-change system to optimize heating efficiency (oven pitch) and maximum bottle diameter (blowing pitch)
- Simple, solid and reliable system
- Servo-driven unit for same-time preform and bottle transfer
- Precise and gentle preform holding
- Very high transfer speed
- Quick change of personalized parts (tool-less)

The SFL range

Standard platform.

On this machines (basic configuration) it is possible to produce the following containers:

- Water Lightweight, CSD, Milk, Edible Oil
- Large size (from 3 litres up to 12 litres)
- Wide Mouth container (blow 'n' trim)

Dedicated Kit on Standard platform.

With the installation of special kits, the standard machine can also produce the following containers:

- Heat Set, WarmFill, Pasteurizable
- Oval bottle
- Oriented and Off-centered neck finish
- Large Bottle (up to 12 liters) with Handle
- Long neck
- OPP

Special machine / dedicated platform.

- Wide Mouth containers (jars with neck diameters from 55mm up to 130mm)
- Large Size (from 5L up to 30L)

* Output (b/h)										
	Models	Blowing Cavities	Max Bottle Size (l)							
				Going Quick	Bottle Size	Going Big	Bottle Size	Even Bigger	Bottle Size	cav
Standard Bottle	SFL 6/6 SS	6	1.5	10,800	0.5	9,600	1.5			
	SFL 6/6	6	3	9,600	0.5	7,800	3	1,800	8	2
	SFL 4/4	4	3	7,200	0.5	5,600	3			
	SFL 6/6 XXL	6	5	7,800	0.5	6,000	5	1,500	12	2
	SFL 6/4 XL	4	5	6,000	0.5	4,800	5			
	SFL 4/3 XL	3	5	5,100	0.5	3,600	5	800	12	1
	SFL 6/4 XXL	4	12	4,000	5	3,000	12			
	SFL 6/3 XL	3	12	3,600	5	2,400	12			
Large Size	SFL 4/2 XL	2	12	2,400	5	1,600	12			
Wide Mouth	SFL 2/2	2	25	1,500	5	1,000	25			
	SFL 2/1	1	30	800	5	500	30			
			Max Neck finish (mm)							
	SFL 4/4 WM	4	95	5,600	0.5	3,800	3			
	SFL 4/3XL WM	3	130	3,900	0.5	2,400	5	600	12	1
	SFL 4/2XL WM	2	130	2,600	0.5	1,200	12			
* The above figures are indicative and they must be confirmed by the Technical Department for specific applications										



4 Stretching and blowing

- Electrically driven blowing clamp, no oil
- Servo-driven motion with levers and oscillator
- High clamp speed
- Double-sided pneumatic compensation
- Servo driven stretch rods
- Fine setting of stretch profile thanks to servo control
- Blow seals, fast and independent for every cavity
- Self-learning of stretch stroke based on preform-bottle size
- High tech blowing valves: fast and independent for every cavity, with individual pre-blow flow regulation

- Very quick exhaust
- Single cavity pressure monitoring (option)
- Standard Air tanks for peak blowing ramp, providing higher output
- By-pass valve to avoid chilled water when not in production
- Less power consumption once machine is in idle mode or is waiting for downstream
- No condensation on blow moulds once the machine is not blowing bottles

5 Bottle ejection

- Servo-driven unit for bottle discharge
- Discharge on air conveyor or belt conveyor or vacuum conveyor
- Bottle base cooling option



Fast, simple, versatile

SIPA's goal in the development of this 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 moulding process. The efficiency of the oven heating and ventilation does not impose thermal conditioning limits on the preforms. The system for the blow moulding 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 moulding, we have adopted the same air supply and recovery circuits and monoblock valves that are used on our rotary blow moulding 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.

Versatile

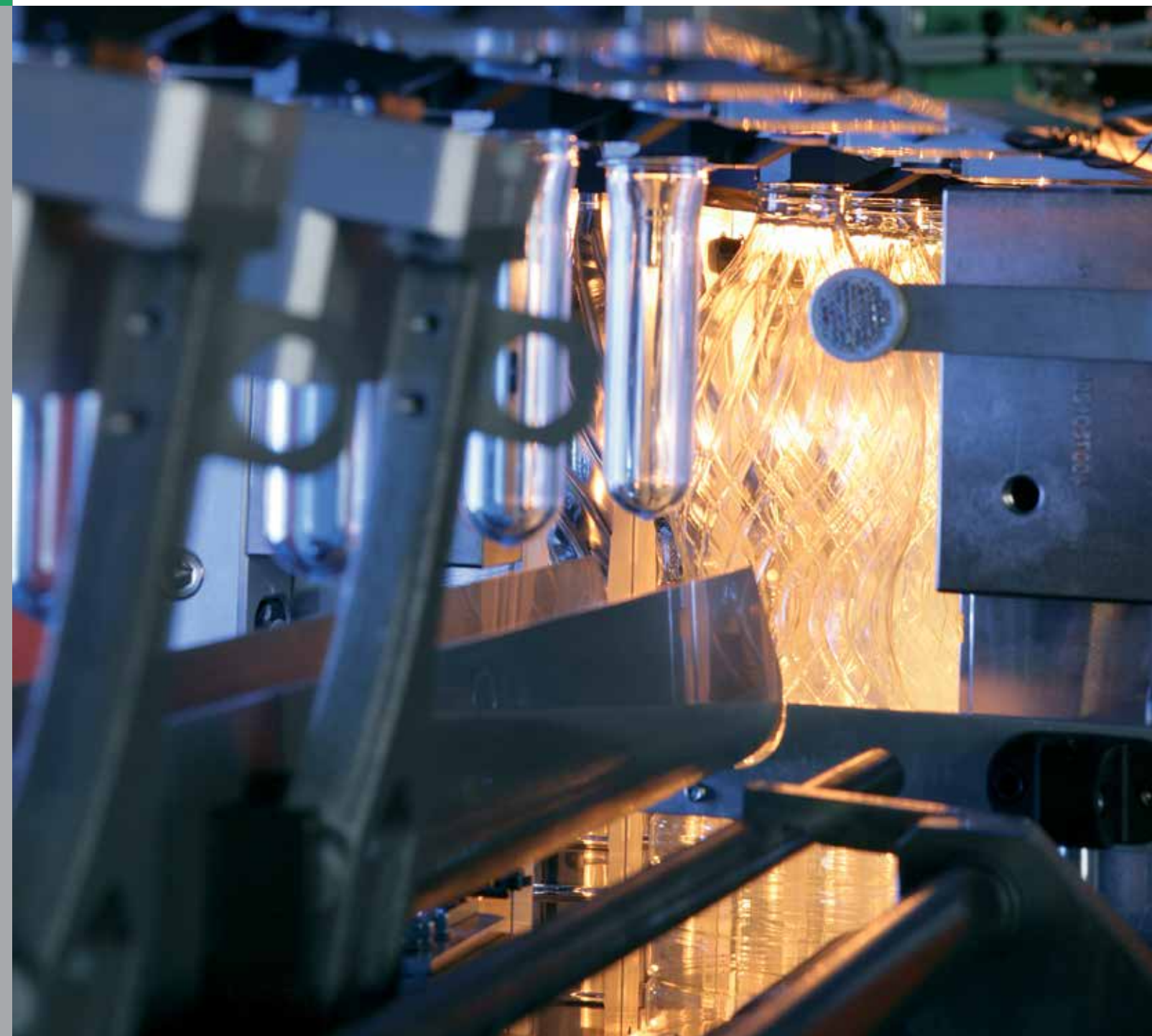
All models of the SFL series can produce a wide range of containers, from 0.10 litres up to 30 litres. The production versatility and flexibility enables quick and simple changing from one format to another. The system for gripping the preforms enables the type of neck to be changed (from 28 mm up to 48 mm) with simple operations and without the use of tools and adjustments. The gripping system also minimises the number of personalised parts.

Compact

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.

Clean

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.



SIPA's SFL linear blow moulding platforms provide the customers with a simple and cost saving system. At the same time the SFL range guarantees production flexibility and container quality consistency.



Easy to use, reliable, low maintenance

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

Automation and operator interface module

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 moulding 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.

- 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 moulding process, alarms and diagnostics, production statistics, maintenance procedures and video, manuals and spare parts lists.

- Modem connection with SIPA customer support service.

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 moulds, 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.

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.



- *Extremely quick and easy mould changeover: 30 min one operator.*
- *Roller table for simple mould change.*
- *In case of neck change, it may require additional quick-change items (replacement of in-feed star wheel, chain spindles, transfer grippers, blow seals/stretch rods).*
- *Simple and easy adjustments on unscrambler rollers and preform guide rails.*

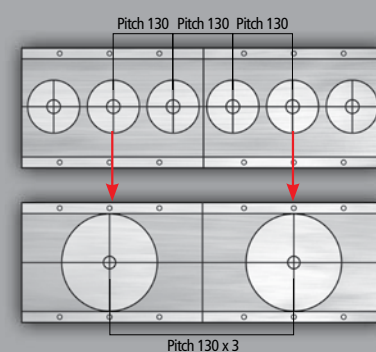
Standard machine

The SFL standard machine platform provides great production flexibility in term of different types of containers to be produced with the aid of special kits. Machine configuration can also be changed to produce small or large size containers on the same platform.

Production Flexibility

Our SFL linear blow moulding machines are very versatile and can produce different bottles on the same platform while maintaining the position of corresponding cavities. It is sufficient to have new blow mould and new loading star wheel. It is also possible to re-configure an existing machine to produce containers with different sizes requiring different blowing pitches. In this case, it is required to have new stretch and blow assembly, new piping, new pitch change assembly, new transfer assembly and new blow mould.

Example base on SFL 6/6



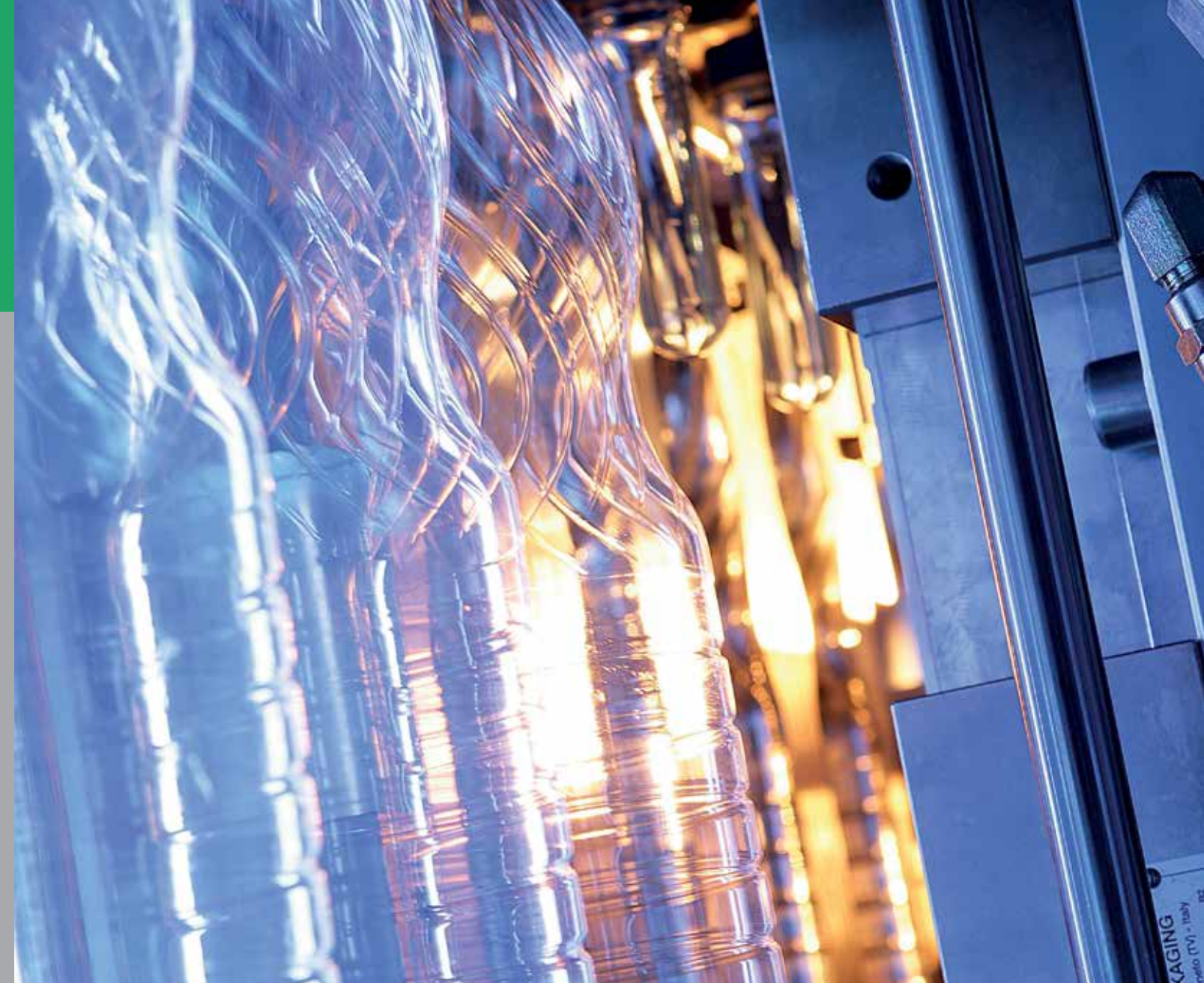
To produce different bottles on existing machine, it's sufficient to have:

- New blow mould
- New loading star wheel

FROM 6 cavity: max 2 L

TO 2 cavity: max 8 L

6 Special kits for: Heat Set, Preferential Heating for oval shapes, Neck Orientation, Handle Insertion, Long Neck, OPP.



Hot fill bottles



- 500ml @ 20g, 89°C in-line
- 500ml @ 28g, 89°C OFF-line
- 1500ml @ 44g, 89°C in-line

Heated blow moulds. Valve to control air cooling through stretch rods. Bored stretch rods (with optional quick-change system). Dedicated exhaust system.

Oval containers



- 20oz @ 25g, 1300 bhc
- 500ml @ 34g, 1200 bhc

Special oven placed at the end of standard oven: double sided lamps, without preform rotation. Lamps power controlled independently. Ventilation provided by small fans plus hot-air extraction.

Neck orientation



- 8oz @ 20g, 1400 bhc
- 500ml @ 34g, 1200 bhc

Spindle and preform neck orientation, in relation with bottle orientation in blow mould. Three sensors installed to check preforms proper orientation.

Bottles with handles



- 1800ml @ 65g, 1200 bhc (oval)
- 3000ml @ 85g, 1200 bhc (oval)

Hydraulic piston moves inserts on the mould to create the undercut for the handle during the blow process.

Long neck



- 500ml @ 34g, 1200 bhc
- 1750ml @ 83g, 900 bhc
- Handling neck finish higher than 25mm

Machine modification to allow neck finish taller than 25 mm (upto 65 mm).

OPP



- 250ml @ 15g, 1200 bhc
- 750ml @ 30g, 1200 bhc

Solutions to blow containers with special resin, like OPP (oriented Polypropylene). Special oven controls for very complicated heating process.



Large sizes platform

A dedicated platform to produce a wide range of large size containers, from 12 liters up to 30 liters, for all sort of applications: mineral water, beer, edible oil, mineral oil, detergents, chemicals.

Configurations

2 cavities configuration

- Bottle sizes: up to 20 liters
- Neck finish up to 80 mm

1 cavity configuration

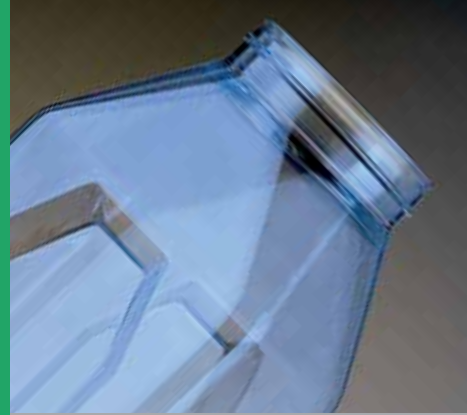
- Bottle size: up to 30 liters

Containers

The following large size containers can be produced:

- 5 US Gal returnable water cooler bottles with or without handle
- 5 US Gal one way water cooler bottles
- 12 liters bottles with up to 48 mm neck
- Stackable bottles up to 25 liters
- Up to 30 liters **beer KEG**
- 10.5 liters **warm filling container with 63 mm neck**
- One way **collapsible** bottles for water dispensers.





SFL wide mouth

A dedicated platform to produce wide mouth containers, very compact, specifically designed to offer flexibility together with output speed.

Two SFL WM Configurations

Version 1 is built for speed.

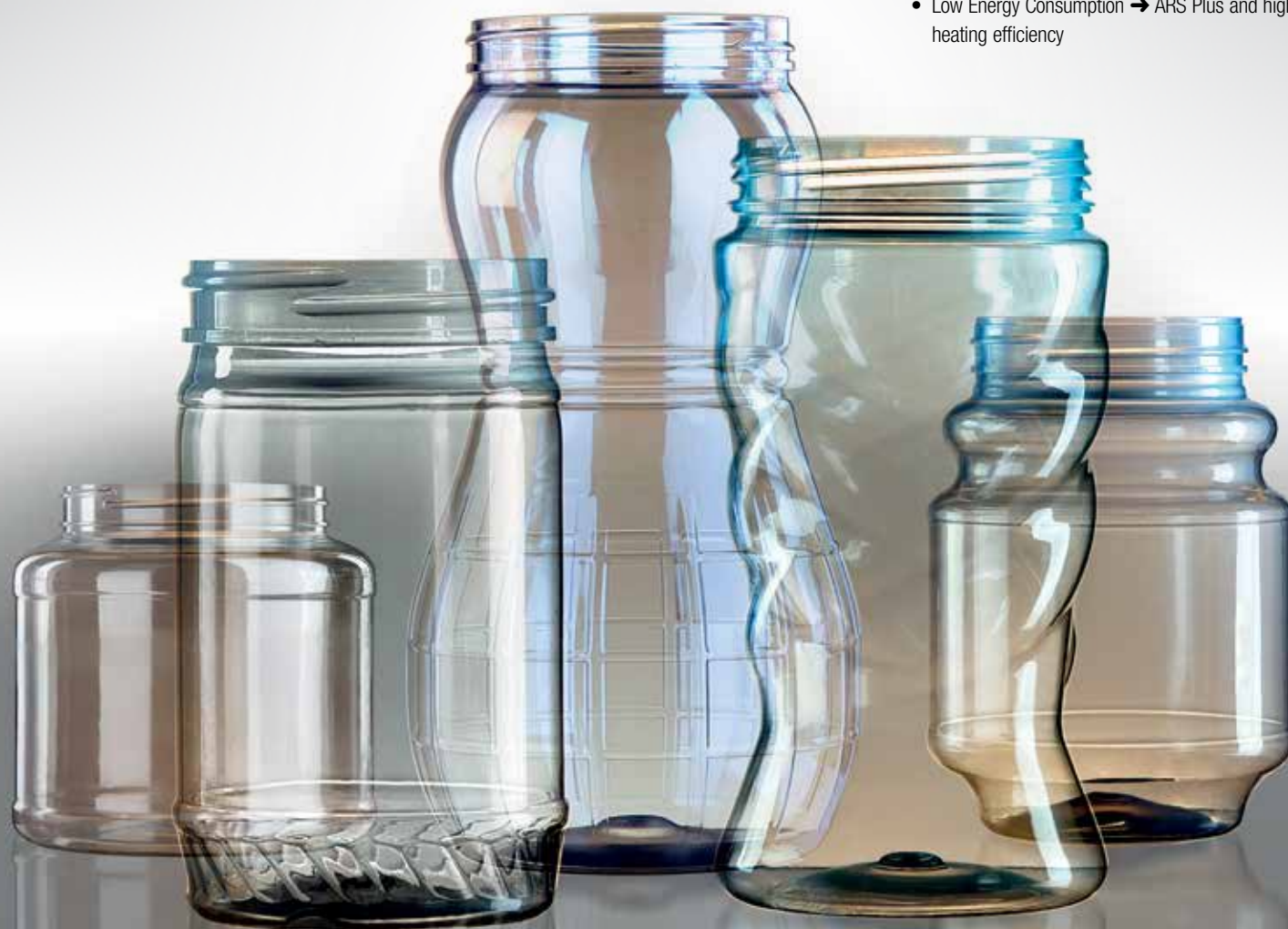
- Output of up to 6,000 containers per hour
- Ideal for processors with dedicated customers or applications
- Neck diameters up to 95 mm
- Maximum container capacity of 3 liters

Version 2 maximizes flexibility.

- Format changes are especially quick and efficient
- Ideal for customers likely to change configurations frequently
- Holds up to four cavities
- Neck diameters up to 130 mm
- Maximum container capacity of 10 liters

Benefits

- Fully Electric blower
- Reliable process (brushless motor for stretch unit, blowing press, oven chain, variable pitch, preform transfer unit, bottle transfer unit)
- Easy accessibility for mould changeover & maintenance
- Fast mould changeover in less than 30 min
- Fast neck changeover in less than 40 min
- Clean → Oil free blower
- Low Energy Consumption → ARS Plus and high heating efficiency



SIPA is the only company in the market with full skills in wide mouth and large sizes preform design and engineering as well as large sizes and wide mouth preform production systems.