

FORMA GLAS
machines + engineering



welcome

Born and raised in a glassmaker's family the material glass was since my childhood part of my life. Soon recognizing the efforts of glassblowing during the manufacturing process of masterpieces it occurred to me to develop glass processing machines.

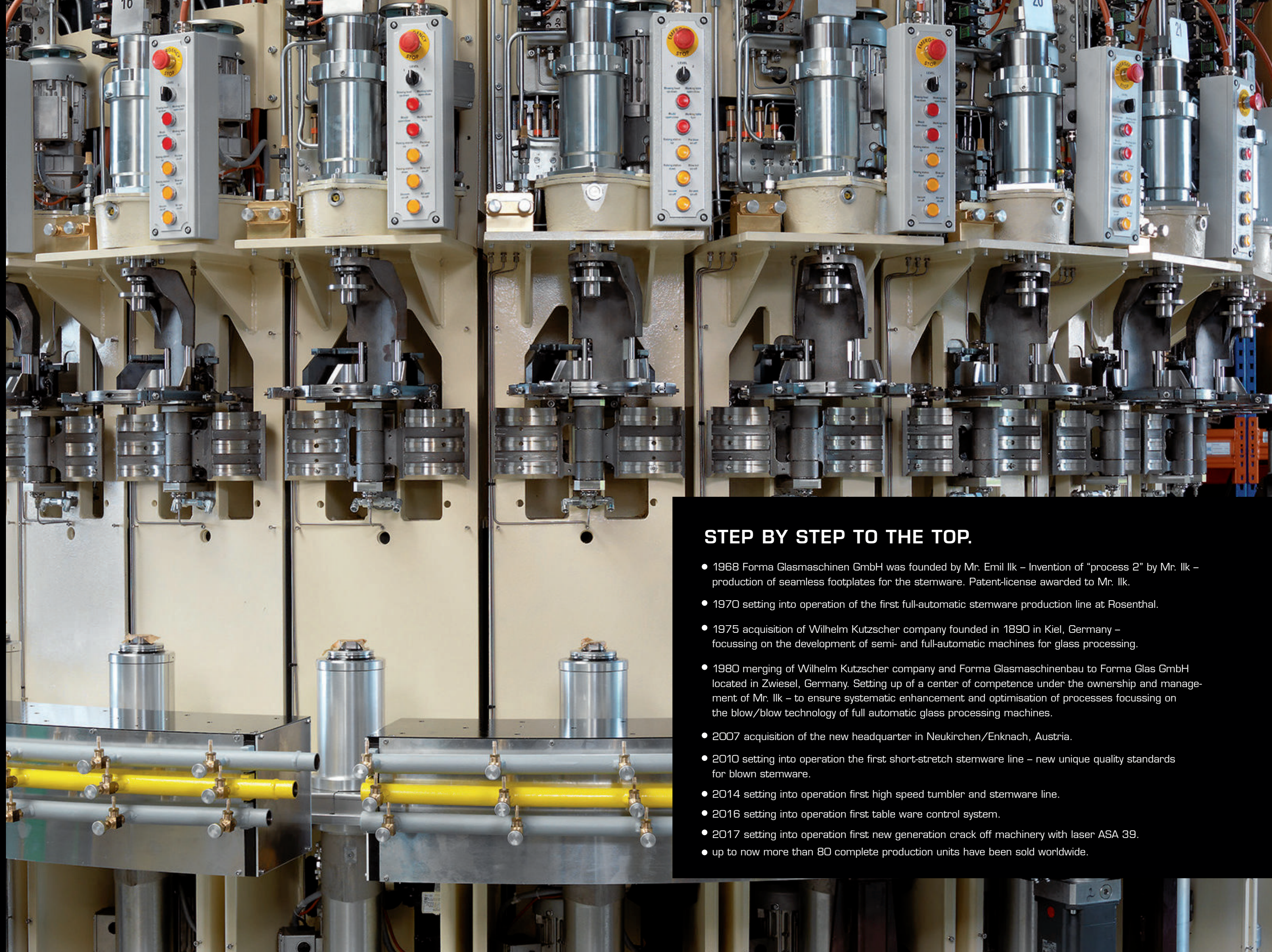
All my professional life was dedicated to achieve this target - to build machines which put out products coming close to handmade masterpieces.

Hence our company's philosophy is "we do not want to be the largest, but the best".

This philosophy drives us continuously to develop, build and optimize machines for the production of glassware at an unique quality level according to the needs of our customers and the markets they serve.



Emil Ilk



STEP BY STEP TO THE TOP.

- 1968 Forma Glasmaschinen GmbH was founded by Mr. Emil Ilk – Invention of “process 2” by Mr. Ilk – production of seamless footplates for the stemware. Patent-license awarded to Mr. Ilk.
- 1970 setting into operation of the first full-automatic stemware production line at Rosenthal.
- 1975 acquisition of Wilhelm Kutzscher company founded in 1890 in Kiel, Germany – focussing on the development of semi- and full-automatic machines for glass processing.
- 1980 merging of Wilhelm Kutzscher company and Forma Glasmaschinenbau to Forma Glas GmbH located in Zwiesel, Germany. Setting up of a center of competence under the ownership and management of Mr. Ilk – to ensure systematic enhancement and optimisation of processes focussing on the blow/blow technology of full automatic glass processing machines.
- 2007 acquisition of the new headquarter in Neukirchen/Enknach, Austria.
- 2010 setting into operation the first short-stretch stemware line – new unique quality standards for blown stemware.
- 2014 setting into operation first high speed tumbler and stemware line.
- 2016 setting into operation first table ware control system.
- 2017 setting into operation first new generation crack off machinery with laser ASA 39.
- up to now more than 80 complete production units have been sold worldwide.



partnership

YOUR REQUIREMENTS ARE OUR GUIDELINES.

Partnership means more than just a word –

It means to us:

- analyze of our customer's technical and economical requirements
- realization of these targets based on our quality standards
- run-in of the machines and carrying out of guarantee-runs
- short reaction time in emergency cases
- longterm-cooperation with our partners and setting at disposal of upgrades
- reliability

185
152

technical assistance

x3) 157/07

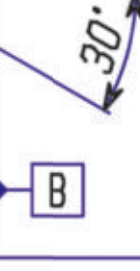
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∅130

Anmerkung 3
zugehörige Formenhälften
gekennzeichnet

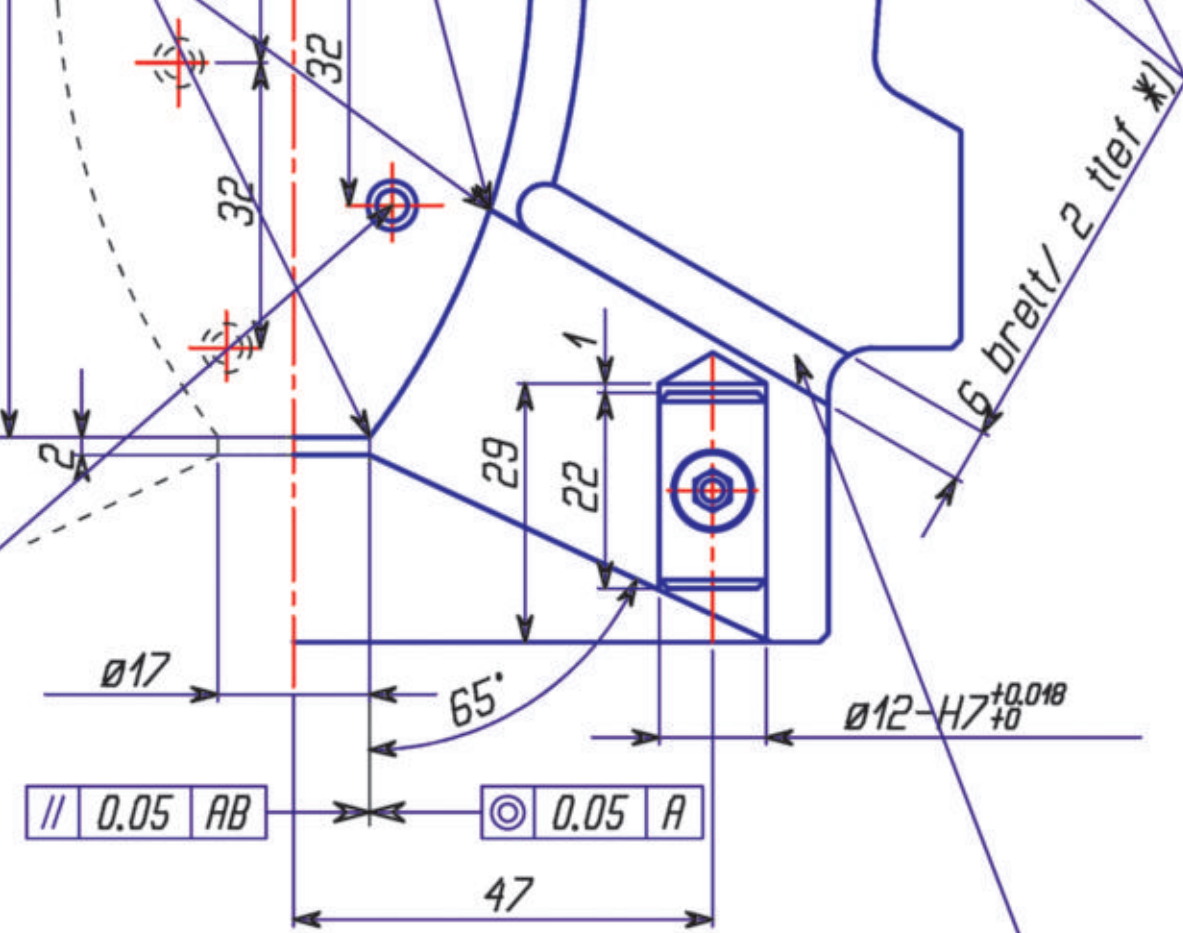
Anmerkung 3

Anmerkung 2



WE ASSIST FROM PLANNING TO "GO-TO-MARKET".

- size-tailored machine solutions
- assistance in product design
- mould engineering and supply
- mutually worked-out „Duty books“ serve as base for the targets to achieve
- implementation of existing infrastructures
- optimization of production output
- control of improvements by timelines set



Zentrierstift 1x
Detail - Kontur

∅42.92

after-sale-service

WE STAND FOR ENDURING PERFORMANCE!

Our collaboration does not end with the delivery, installation and commissioning of the machines, but goes far beyond that.

We offer:

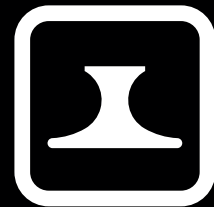
- longterm availability of mechanical and electronic spare parts
- upgrades for machines and control systems
- maintenance and repair service after warranty period

**SUSTAINABILITY MEANS FOR US HIGH TECHNOLOGY –
AND THIS IS OUR DOMAIN.**

- application-specific technical and economical solutions
- optimized configuration and implementation of machines and peripheral devices
- sustainable customer relation by training and education support
- know-how transfer
- technology leader in engineering of energy and cost saving glass processing machines

The modular concept

- We build the machines according to customer's needs.
- The requested capacity of the machine defines the number of modules per machine.
- The modules are mounted on a base frame and can be changed during the production run in less than 10 minutes – a spare module will replace the changed module.
- Minimized down times.
- Each module disposes of a separate electronic control system – this guarantees highest flexibility and characteristic adjustments of production curves.
- Memorized production parameters guarantee shortest setup times.
- Optimized inventory holding for spare parts and components.



(RPH) Press machines with gob feeding for heavy pressware.

(RPH) Press machines with stream feeding for pressware with 8-24 stations.

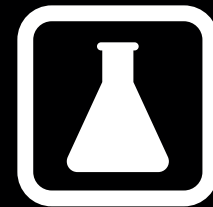


(IBS) Blowing machines for articles up to 300mm height.

(IBS) Blowing machines for high quality tumblers.



Stemware lines for the fully automatic production of high quality stemware.



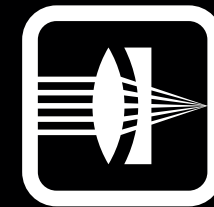
(IBS) Blowing machines for technical glasses.



(IBS) Big volume item blowing machines.



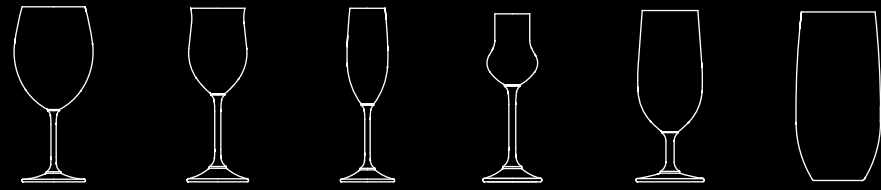
Single and multiple piece moulds for all types of production.



Presses for optical products: spectacle glasses, lenses.



Finishing machines and peripheral equipment.

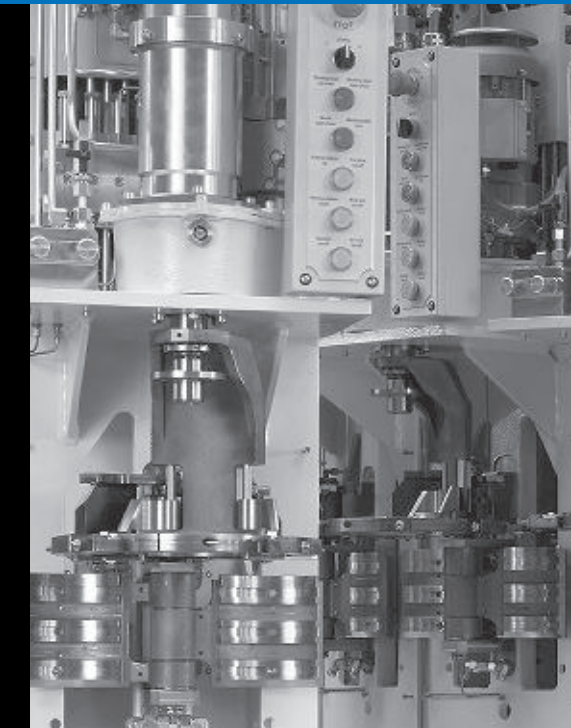
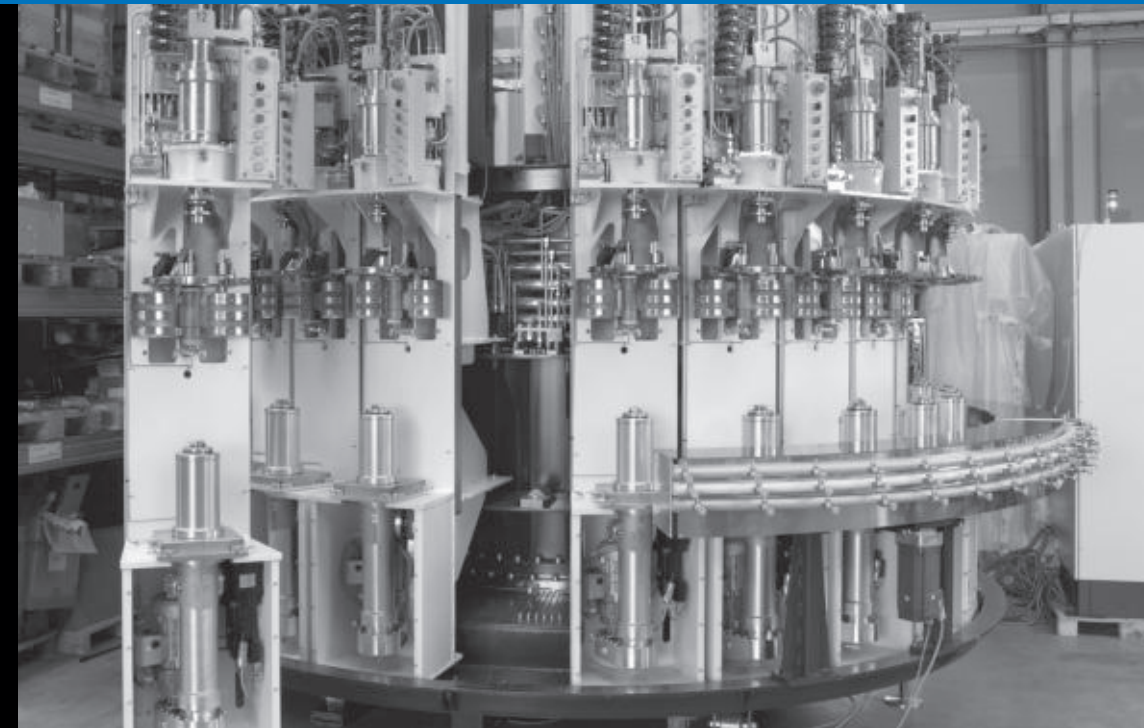
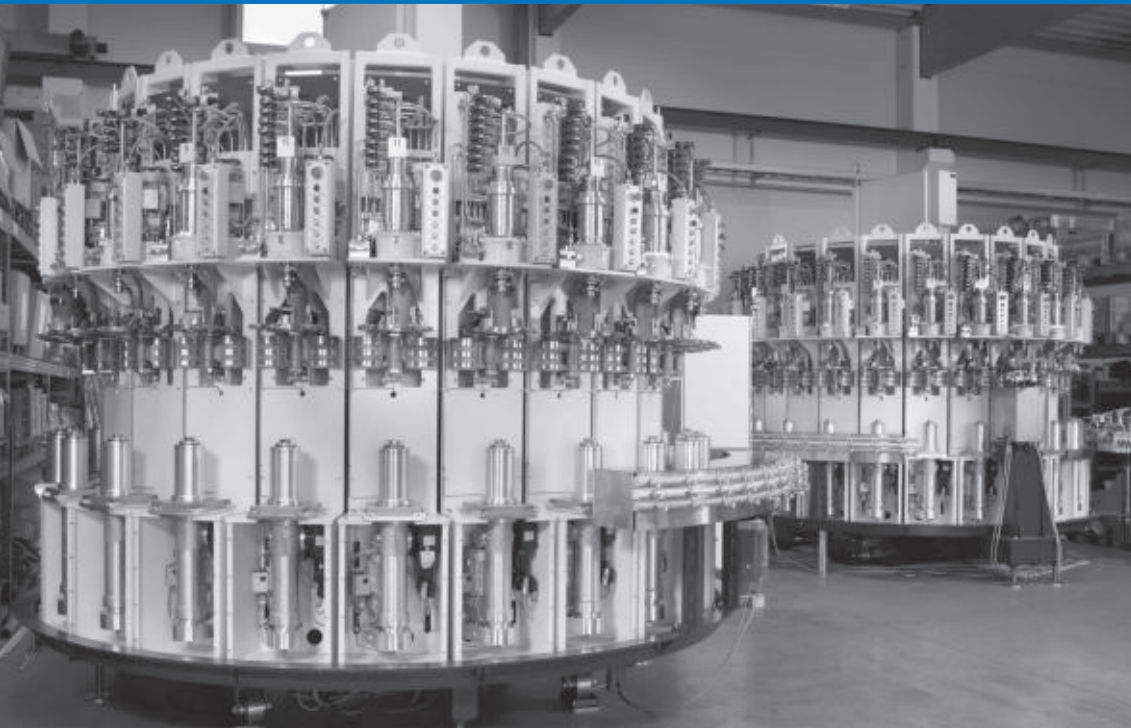


Most important technical features of our new generation of blowing machines IBS:

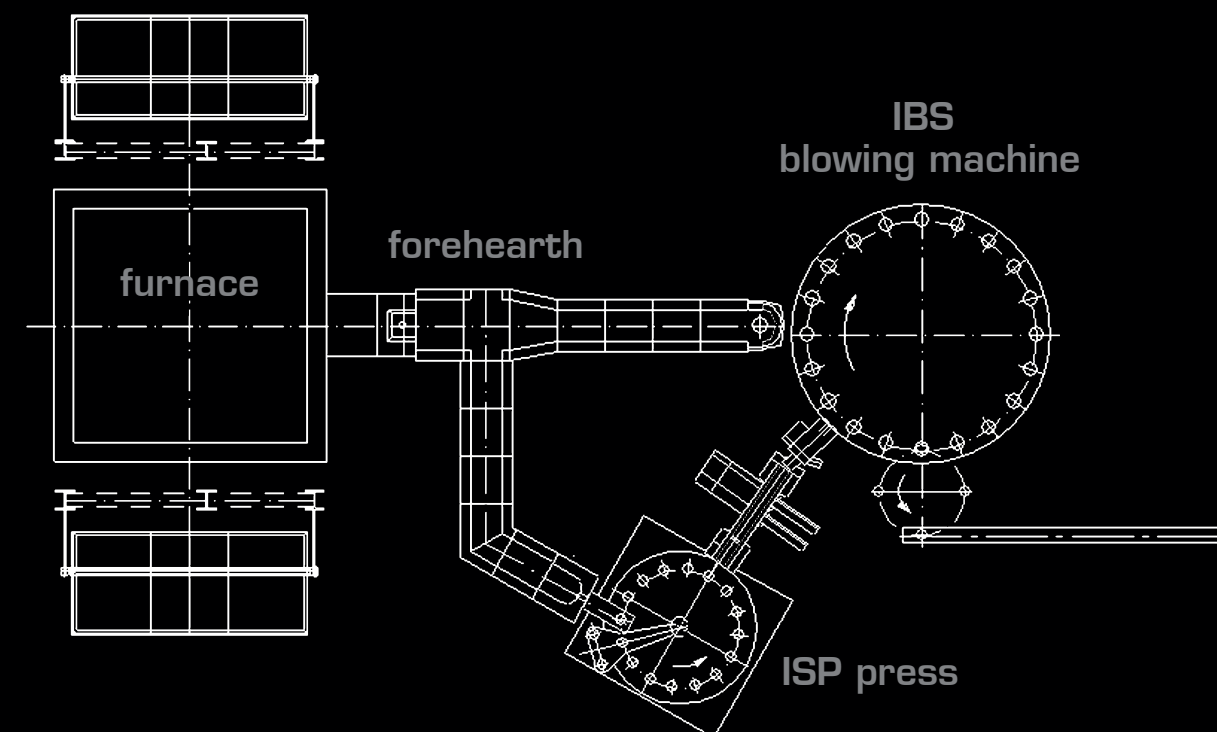
- single station drive of each module
- servo press transfer station with servo actuator motor
- special moving burner units and servo raising stations in combination with a short stretch equipment a perfectly smooth transition from bowl to stem can be achieved.
- quick change system (module can be changed in less than 10 minutes)
- median adapter
- divided, very sturdy working table
- Siemens Simotion Control System

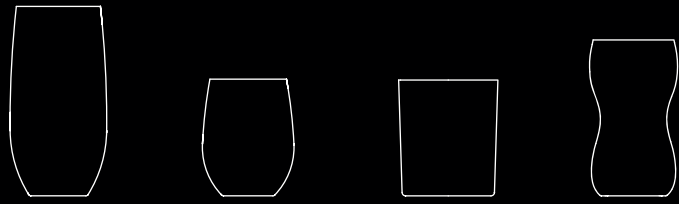
IBS blowing machine

new generation



| Type | IBS 8 | IBS 10 | IBS 12 | IBS 16 | IBS 20 | IBS 24 | IBS 32 |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Number of stations | 8 | 10 | 12 | 16 | 20 | 24 | 32 |
| Number of pieces (per minute) | 6-24 | 6-24 | 6-24 | 6-30 | 10-40 | 12-45 | 14-60 |
| Gob weight (g) | 90-700 | 90-700 | 90-700 | 90-700 | 90-700 | 90-700 | 90-700 |
| Article diameter (mm) | 40-135 | 40-135 | 40-135 | 40-135 | 40-135 | 40-135 | 40-135 |
| Article height with moil (mm) | max. 380 | max. 380 | max. 380 | max. 380 | max. 380 | max. 380 | max. 380 |
| Article height without moil (mm) | max. 300 | max. 300 | max. 300 | max. 300 | max. 300 | max. 300 | max. 300 |
| max. machine height (mm) | 4.400 | 2.150 | 2.150 | 2.150 | 3.500 | 3.500 | 4.000 |
| Machine diameter (mm) | 2.600 | 2.880 | 2.880 | 2.880 | 3.300 | 4.300 | 5.800 |
| glass types can be processed | all types | all types | all types | all types | all types | all types | all types |
| Wall thickness (mm) | 0,7-3 | 0,7-3 | 0,7-3 | 0,7-3 | 0,7-3 | 0,7-3 | 0,7-3 |
| Bottom thickness (mm) | 3-30 | 3-30 | 3-30 | 3-30 | 3-30 | 3-30 | 3-30 |
| Weight (t) approx. | 6,0 | 6,6 | 6,8 | 7,0 | 10,2 | 19,0 | 35,0 |



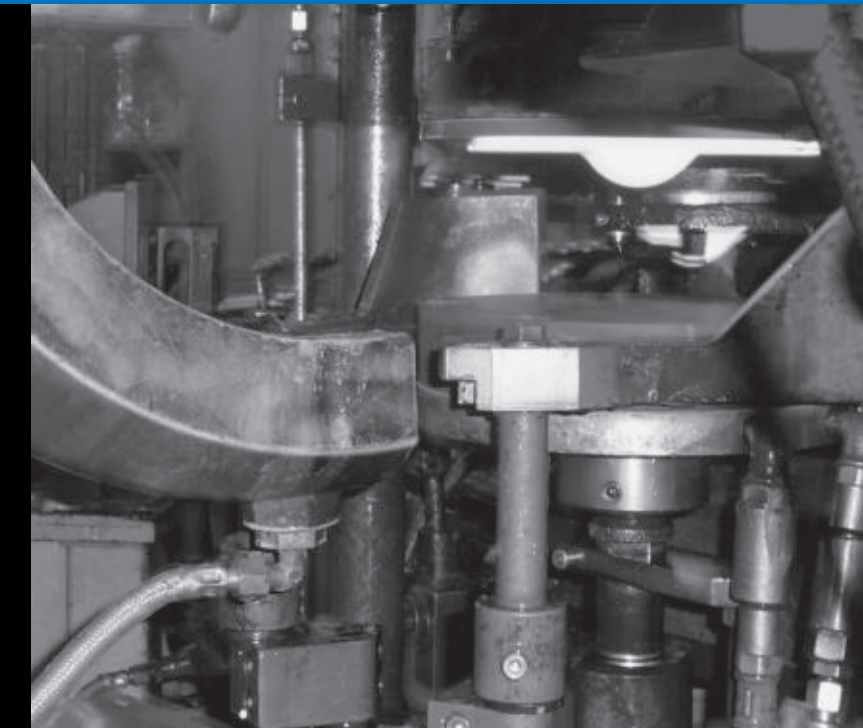
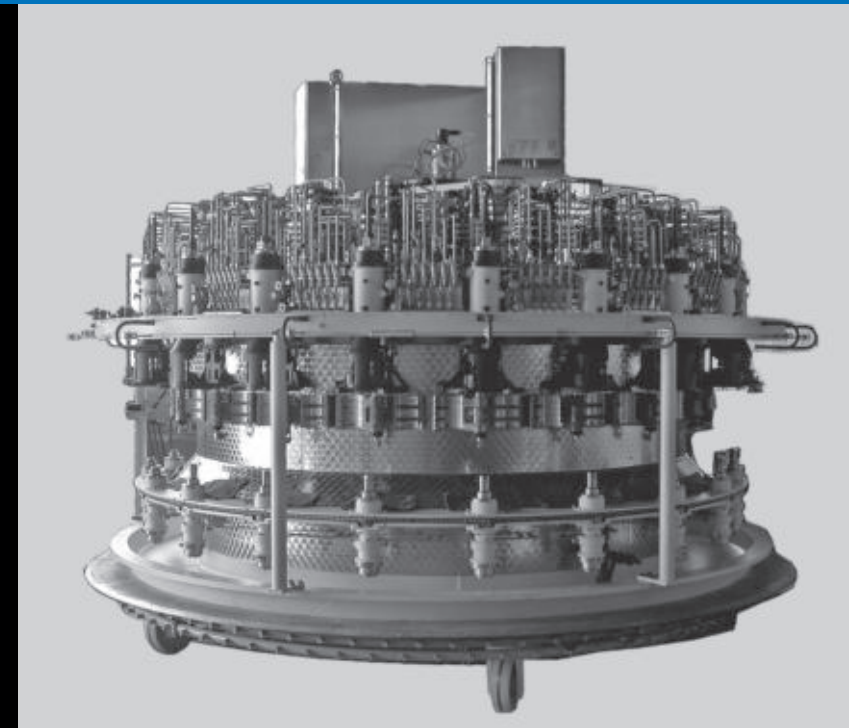
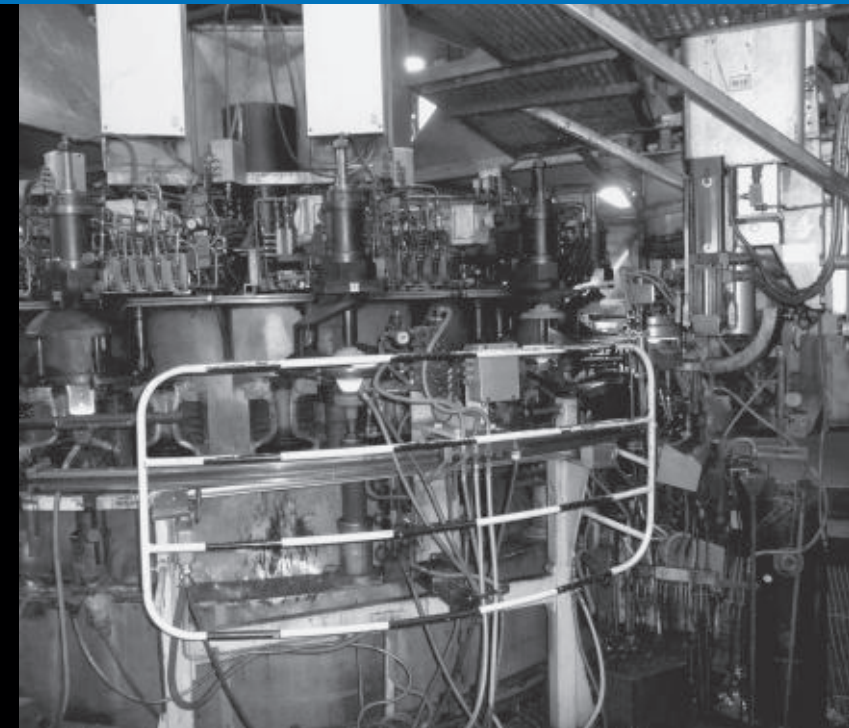
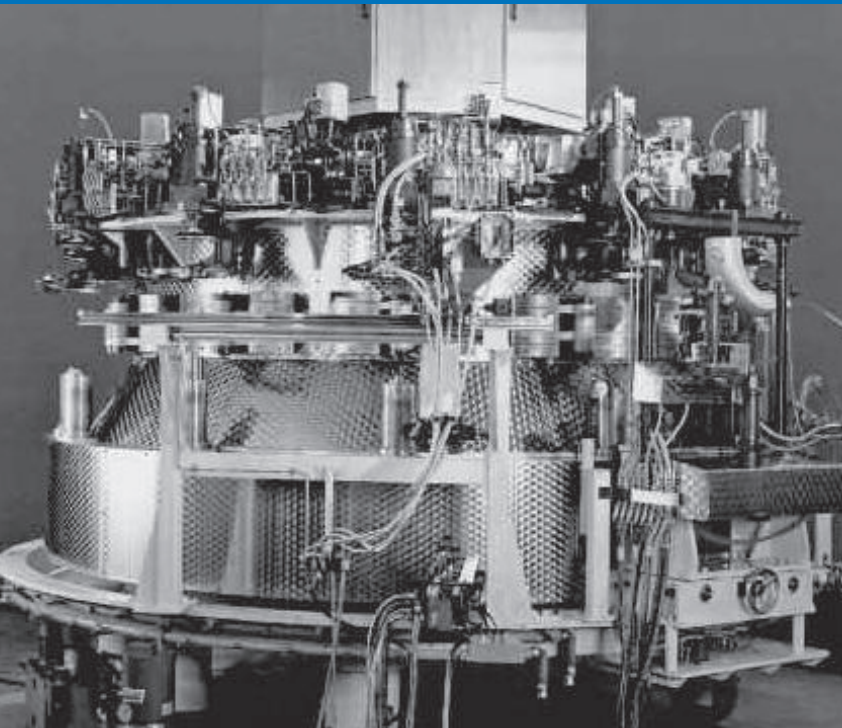


Most important technical features of our new generation of blowing machines IBS:

- designed for big volume items
- module version
- processor-controlled
- centrally high pressure lubricating equipment
- raising stations / servo raising stations
- synchronisation equipment

IBS blowing machine

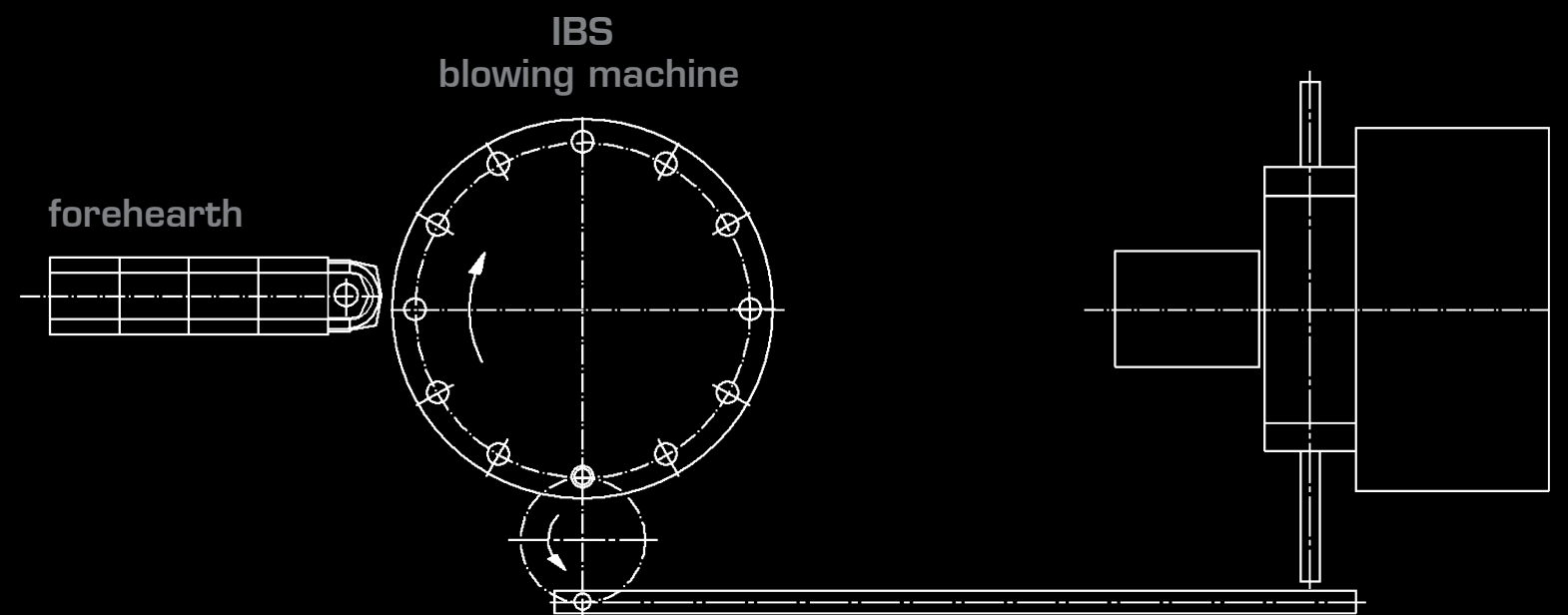
big volumes



Type (electrical)

| | IBS 10e | IBS 12e | IBS 16e |
|-------------------------------------------|--------------------|--------------------|----------------|
| Number of stations | 10 | 12 | 16 |
| Production speed (pieces/minute) | 6-24 | 6-24 | 6-24 |
| Gob weight (g) depending on feeder | max. 2.500-3.000g* | max. 2.500-3.000g* | max. 1.700g* |
| Article diameter in mould holder | max. 240 mm | max. 240 mm | max. 180 mm |
| Article height with moil | max. 450 mm | max. 450 mm | max. 450 mm |
| Article height without moil max. 470mm | max. 350 mm | max. 350 mm | max. 350 mm |

* The gob weight depends on the type of feeder.



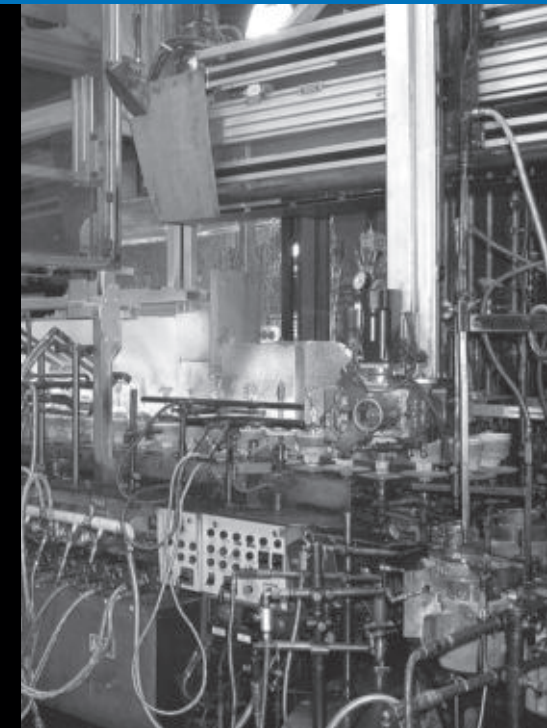
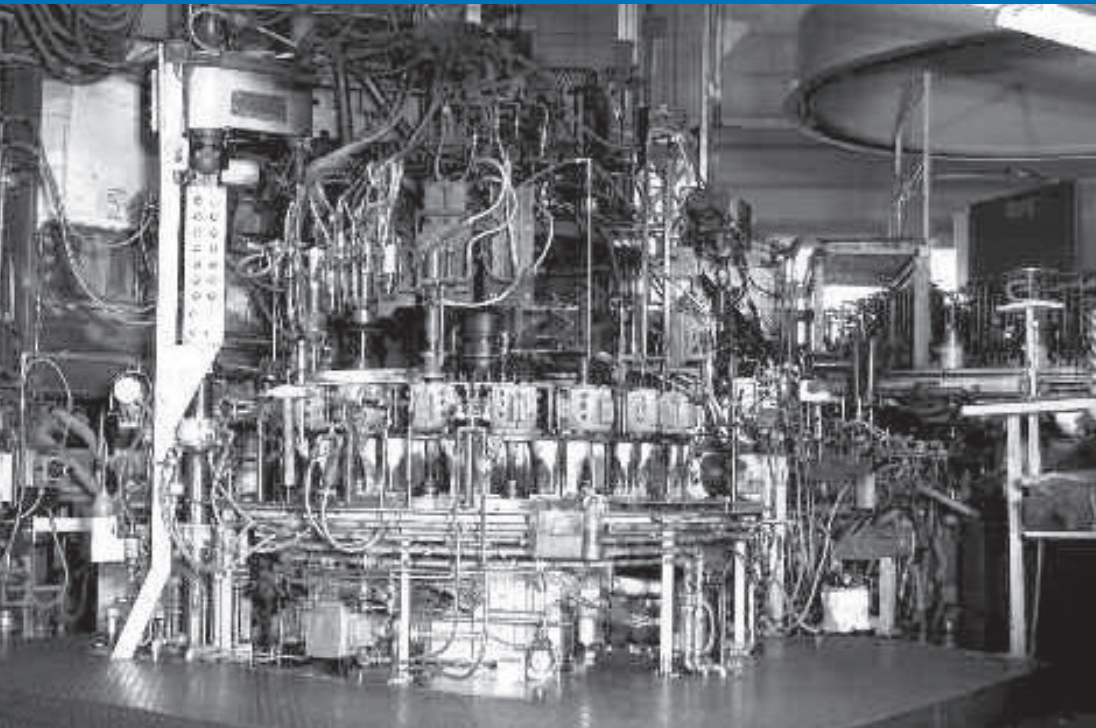


press machines

stems

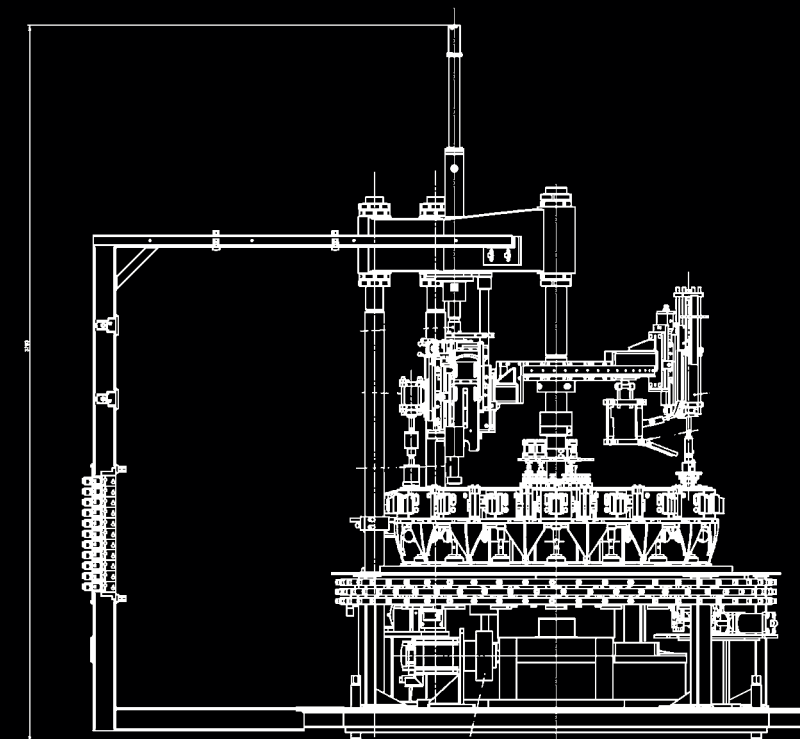
Most important technical features of our new generation of press machines stems:

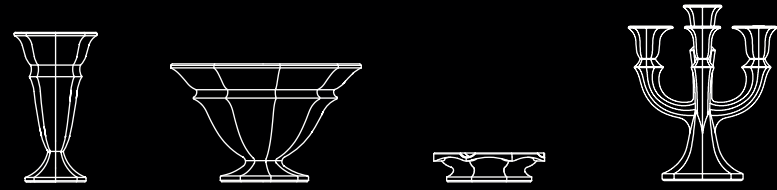
- driving system with servo-actuator-motors
- parallel shears guarantee optimized production speed at highest quality level
- footplates without seam-lines
- mould pre-opening system
- force-speed-control of plunger by servo pump



| Type | RPH 8 | RPH 12 | RPH 16 | RPH 20 | RPH 24 |
|------------------------------------|-----------------------------------------------|----------|----------|----------|-----------|
| Number of stations | 8 | 12 | 16 | 20 | 12 double |
| Number of pieces (per minute) | 5-20 | 5-30 | 5-45 | 5-50 | 5-60 |
| Gob weight (g) with special feeder | max. 250 | max. 250 | max. 250 | max. 250 | max. 250 |
| Article height with base (mm)* | max. 130 | max. 130 | max. 130 | max. 130 | max. 130 |
| Diameter of base (mm)* | max. 90 | max. 90 | max. 90 | max. 90 | max. 90 |
| possible press moulds | one-, two- and three-part-moulds | | | | |
| Press feeder | continuous stream feeding and gob feeding | | | | |
| Setting of the feeding point | through motor fine adjustment or chute system | | | | |
| Machine height (mm) | 3.400 | 3.400 | 3.800 | 3.800 | 3.800 |
| Diameter of mould table (mm) | 1.160 | 1.160 | 1.870 | 2.250 | 2.815 |
| Maximum machine width (mm) | 1.600 | 1.600 | 2.250 | 3.200 | 4.000 |
| Weight (t) approx. | 6,0 | 7,5 | 9,2 | 11,5 | 15,0 |
| Types of glass | all types can be processed | | | | |

*it is possible to produce with length of 170mm an a Ø 100 mm with special production tools.

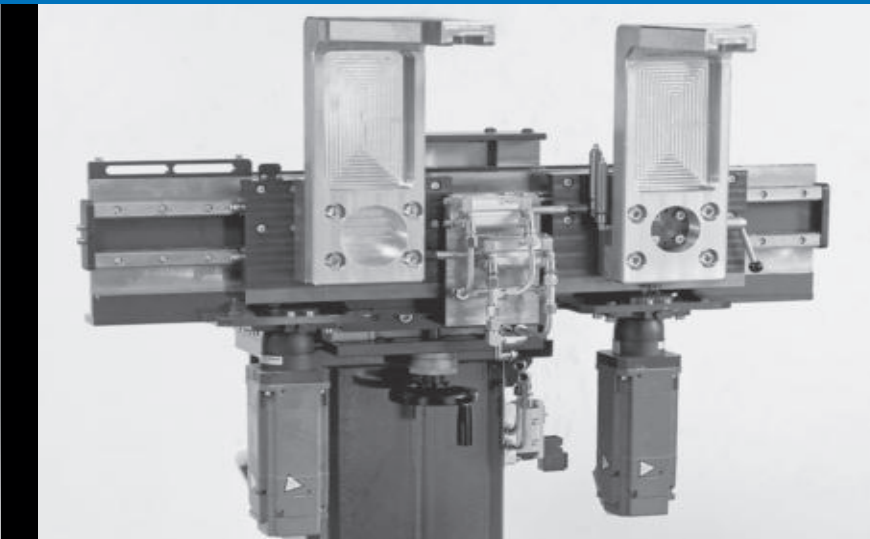
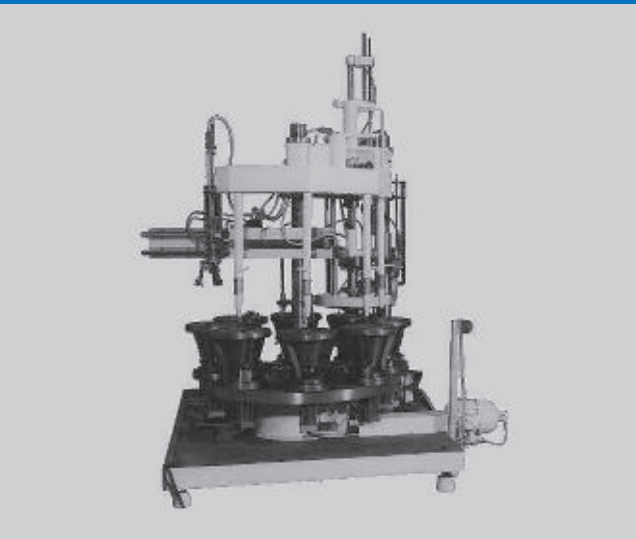




Most important technical features of our new generation of press machines gift items:

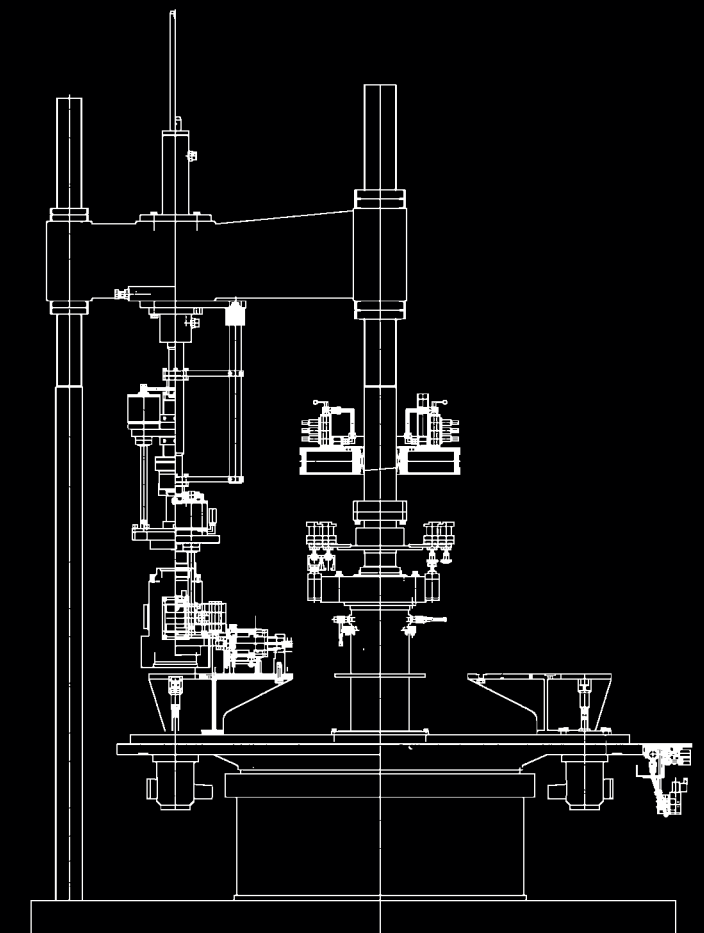
- driving system with servo-actuator-motors
- parallel shears guarantee optimized production speed at highest quality level
- mould pre-opening system
- force-speed-control of plunger by servo pump
- integrated firepolishing system

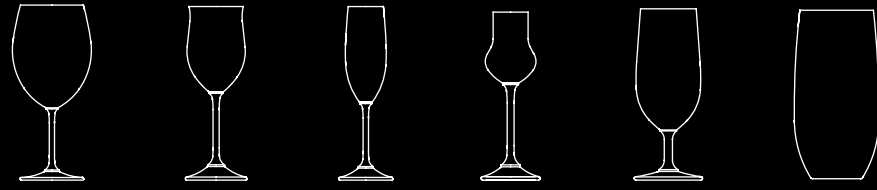
press machines
gift items



Type

| | RPH 6-400 | RPH 8-400 | RPH 12-400 |
|----------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Number of stations | | 6 | 8 |
| Capacity - 8 stations max. | 15/min. dep. on type of glass, article and feeder | 15/min. dep. on type of glass, article and feeder | 15/min. dep. on type of glass, article and feeder |
| Type of articles | fully pressed stemware, stemware, stems, asthtrays, vases tumblers, plates, other articles | fully pressed stemware, stemware, stems, asthtrays, vases tumblers, plates, other articles | fully pressed stemware, stemware, stems, asthtrays, vases tumblers, plates, other articles |
| Article height max. (mm) approx. | max. 350 | max. 350 | max. 350 |
| Article diameter (mm) approx. | max. 300 | max. 300 | max. 300 |
| Press moulds applicable | one, two, three and four-part-moulds | one, two, three and four-part-moulds | one, two, three and four-part-moulds |
| Feeding of press | feeders such as Emhart type 144, special feeders or bail type feeders | feeders such as Emhart type 144, special feeders or bail type feeders | feeders such as Emhart type 144 special feeders |
| Kind of glass | all glass types | all glass types | all glass types |
| Controllability of press | processor-controlled | processor-controlled | processor-controlled |
| Operation of press | fully automatic | fully automatic | fully automatic |
| Article take-out | mechanic or through of vacuum | mechanic or through of vacuum | mechanic or through of vacuum |
| Machine drive | servo actuator drive | servo actuator drive | servo actuator drive |
| Stroke of cylinder | adjustable from 20-400mm | adjustable from 20-400mm | adjustable from 20-400mm |
| Diameter of divided circle | 1.160mm | 1.160mm | 1.160mm |
| Height of press | 3.000mm | 3.000mm | 3.000mm |
| Length of press | 1.830mm | 1.830mm | 1.830mm |
| Width of press | 1.830mm | 1.830mm | 1.830mm |
| Weight of press | approx. 3.500kg | approx. 3.500kg | approx. 3.500kg |



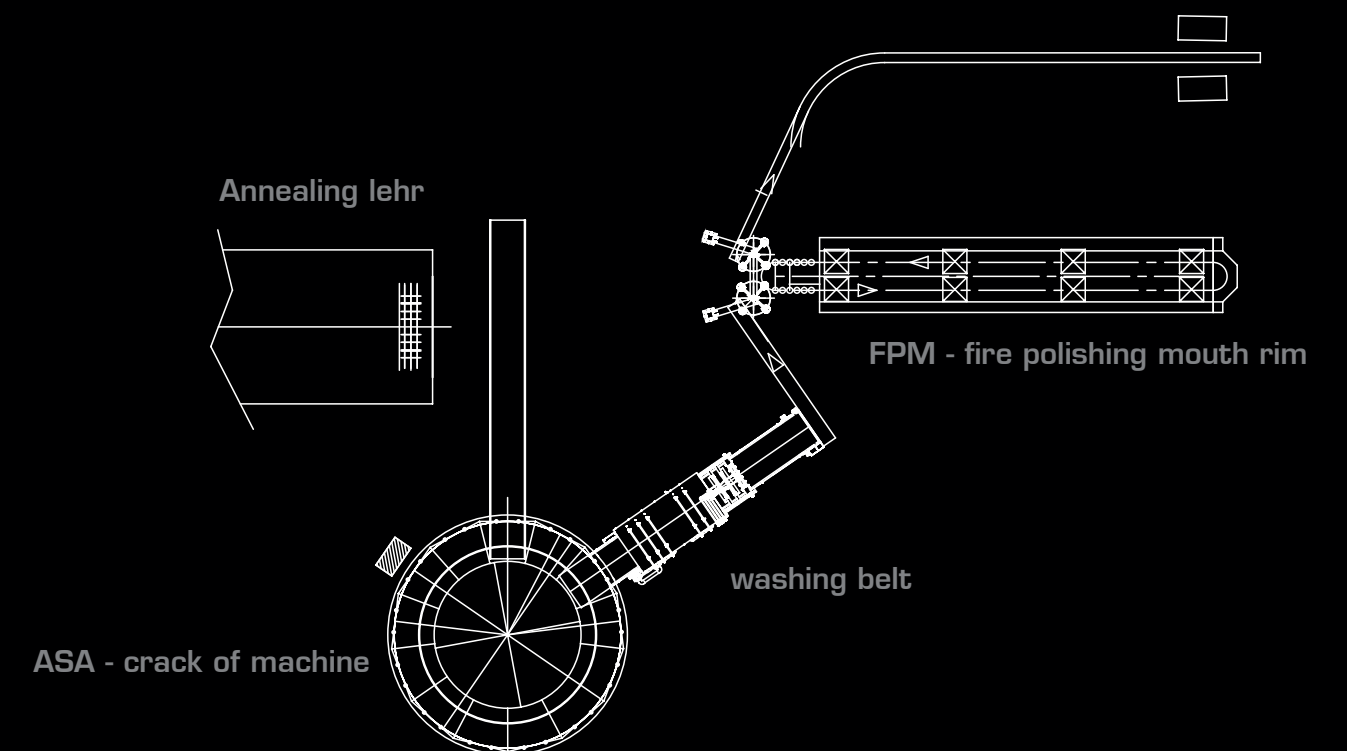


ASA crack-off machine

- capacity up to 70.000 glasses/day with cheap refill costs for laser
- up to 39-station cracking off machine and stem ware
- Single, double and triple loading system
- Single, double and triple laser system
- Flexible mounting off grinding and seaming stations
- clean laser cut without dust
- 3 closed 200 Watt CO2 Laser; up to 3 years lifetime
- special machine design available for:
 - big items up to 300 mm diameter
 - wall thickness up to 7 mm
- incl. washing belt
- incl. fire polishing for mouth rim



| Type | ASA 13/1 | ASA 13/2 | ASA 13/3 |
|----------------------------------|----------|----------|----------|
| Number of stations | 13 | 26 | 39 |
| Number of pieces (per minute) | 23 | 45 | 65 |
| Article diameter (mm) | 30-150 | 30-150 | 30-150 |
| Article height with moil (mm) | 380 | 380 | 380 |
| Article height without moil (mm) | 300 | 300 | 300 |
| Wall thickness (mm) | 0,7-3 | 0,7-3 | 0,7-3 |
| all types of glasses | | | |
| Max. machine weight (t) | 7 | 11 | 16 |
| Max. machine height (mm) | 4.600 | 4.600 | 4.600 |
| Machine diameter (mm) | 3.000 | 4.000 | 5.000 |



upgrades



1

Take out mechanism (1)

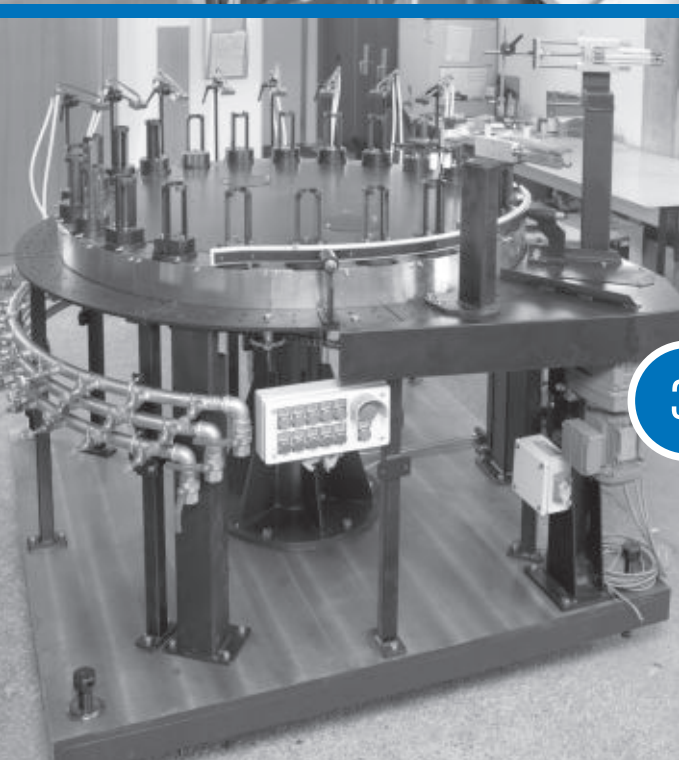
- full-automatic removal of stemware, tumblers... from the blowing machines IBS
- up-side-down positioning on the conveyor belt for safe transportation
- synchronized with blowing machine
- optional clock- or counter-clockwise operation



2

Transfer station (2)

- faster production cycle – 2 to 3 pieces more per min.
- exact pressing due to servomotor
- gap-free gob transfer due to servoactuator
- by usage of a rotary distributor no more leakage of flexible hoses during gob transfer
- can be retrofitted onto all FORMA blowing machines



3

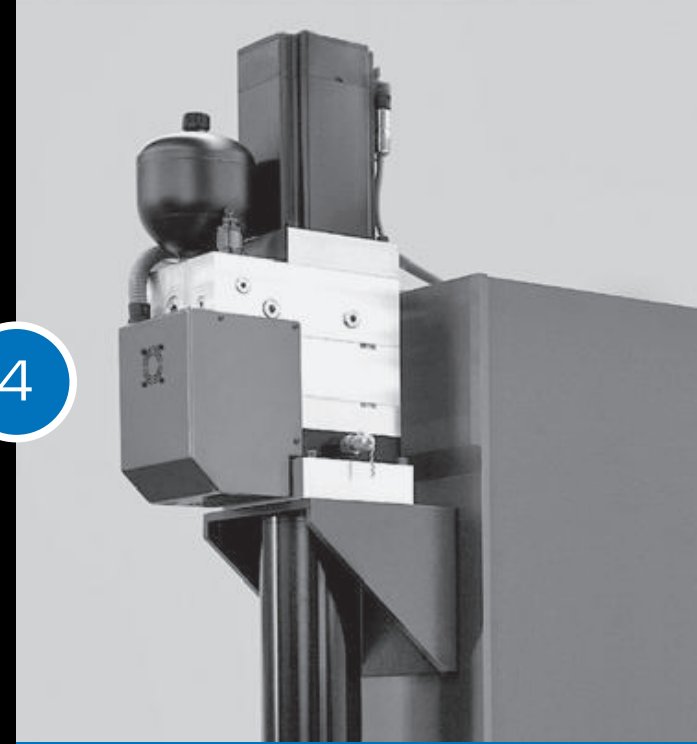
Firepolishing machine (3)

- for the polishing off of seamlines on stems
- for the smooth transition from bowl to stem and stem to footplate
- reheating for the short-stretch process
- can be retrofitted onto all Forma blowing machines

Servo-hydraulic for pressing (4)

- in the new presses we also use a new method in the Stationary Hydraulics - Hybrid Ram with Closed Loop Oil Circuit. This system permits high power density and high dynamics.
- the new press-unit consists of the following components:
 - press-cylinder double acting
 - servo motor and servo pumps, aligned with the cylinder surfaces
 - compensation tank and pressure safety valve
 - the new press-unit is fixed on the crossbar of the press

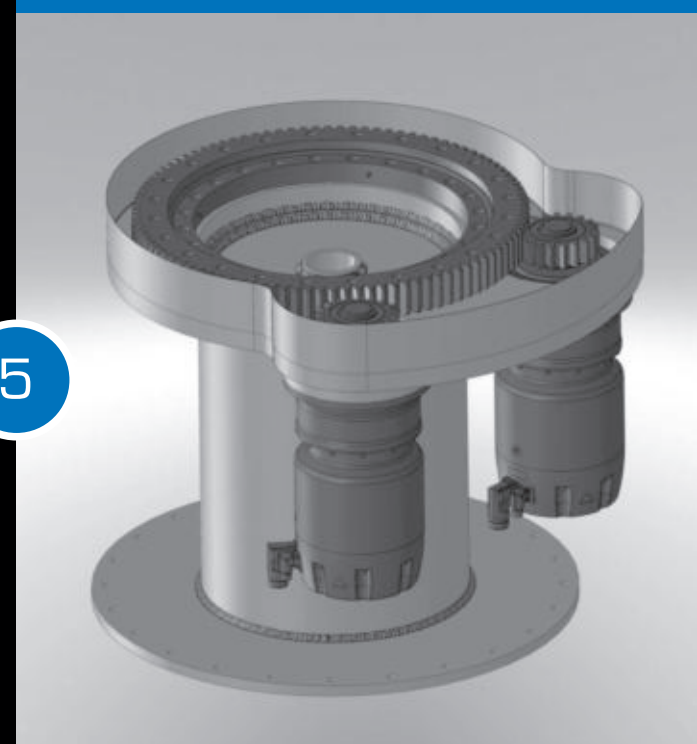
4



New drive system for presses (5)

- special ring gear drive system with 2 Servoactuators designed for high load and less backlash
- presses with mould radius 30" and max. press capacity 30 kN need no table support
- 2 rotary servo actuators with water cooling for high speed drive. The actuators are combined at acceleration and deceleration – at positioning they work against each other with abt. 30% of its torque – this secures highest precision
- high torsional rigidity and coupling free integration between motor and transmission
- drive system is designed for 0,4 sec for moving presstable with mold radius 38" abt. 22,5 degree

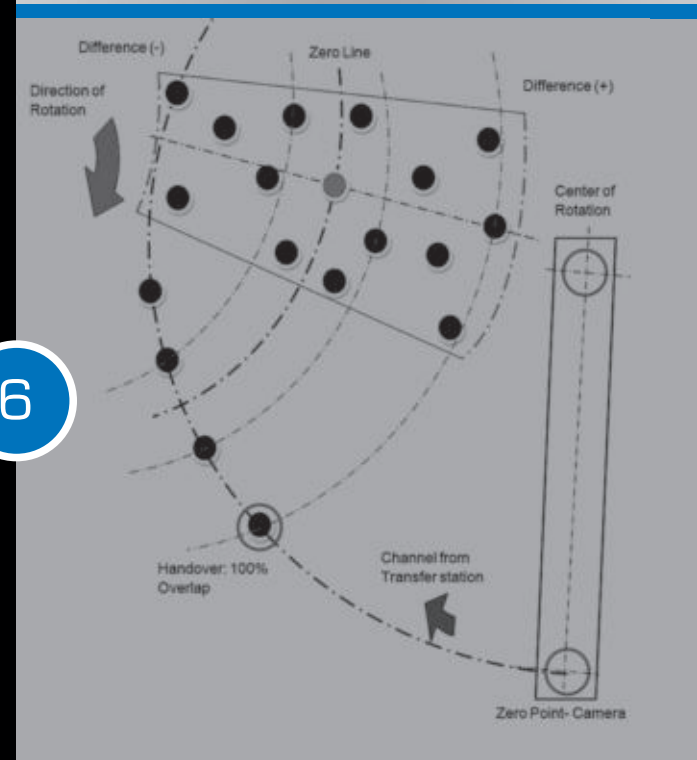
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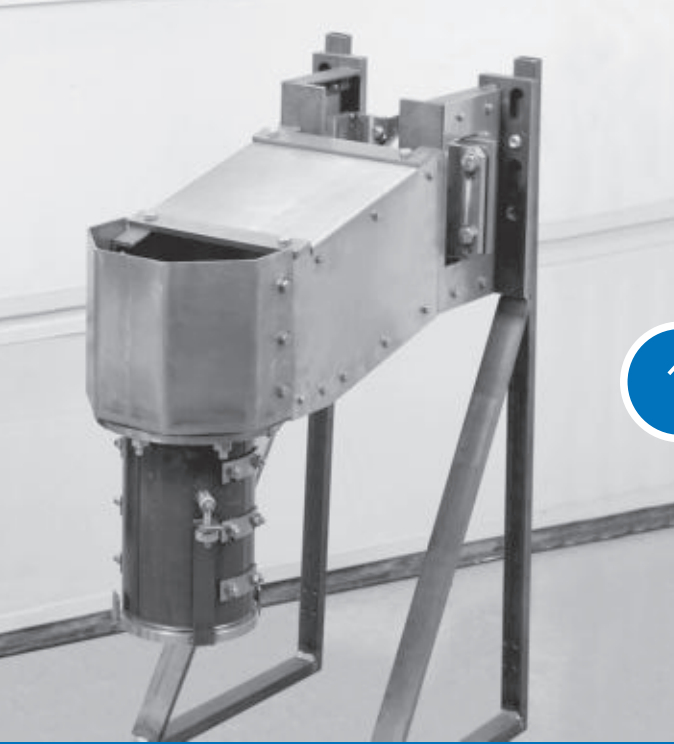
Camera monitoring system (6)

- secures the optimized positioning of the gob on the working table
- secures the 100% centered blowing process
- each individual position of the working table is memorized – hence the camera monitoring system can be multiple used on different machines
- can be retrofitted onto all Forma blowing machines for multiple usage

6



peripheral devices



1

Platinum feeder (1)

optimized weight-and control technology for stems and small giftitems



2

Mechanical Gob Feeder and Servo Gob Feeder (2)

universal feeder for blow and press machines



3

Sandblasting machines (3)

for the decent yet life-long marking of all glass items

tableware inspection machine for tumbler, stemware and pressed products

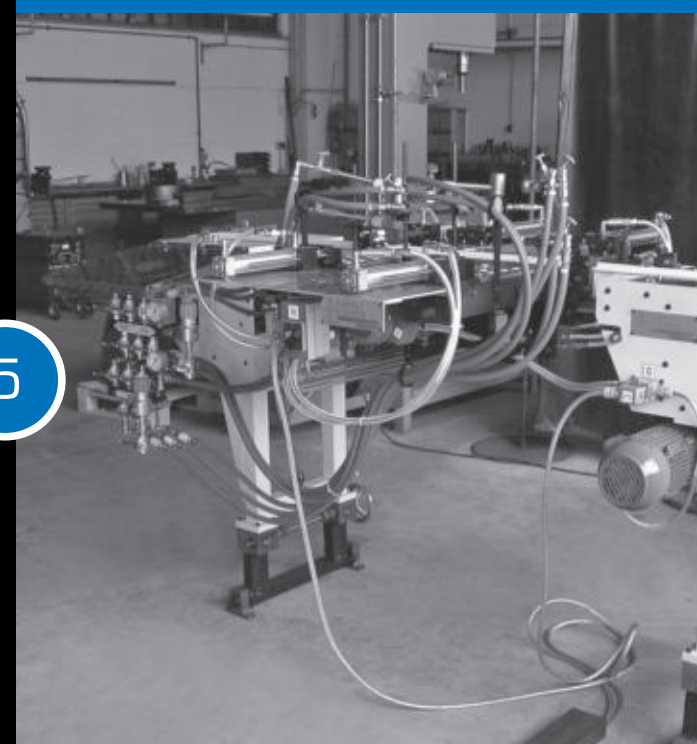
4



conveyor belts with different coatings (5)

available with different coatings to avoid any scratches or any kind of dirtying of the items during transportation

5



heavy-duty mould pastes and cooling and lubrication liquids (6)

adapted to the special needs of our glass processing machines

6



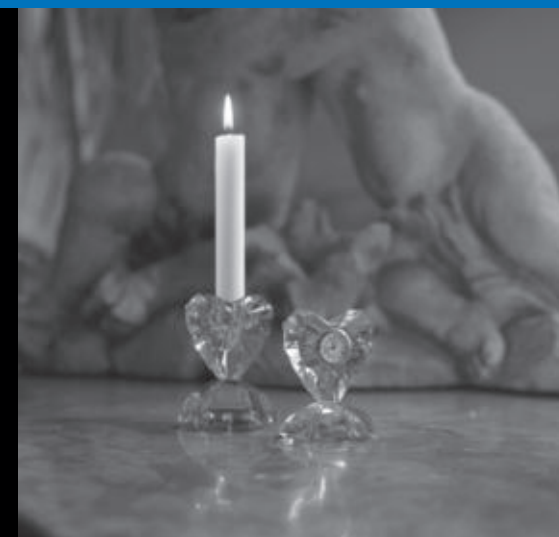
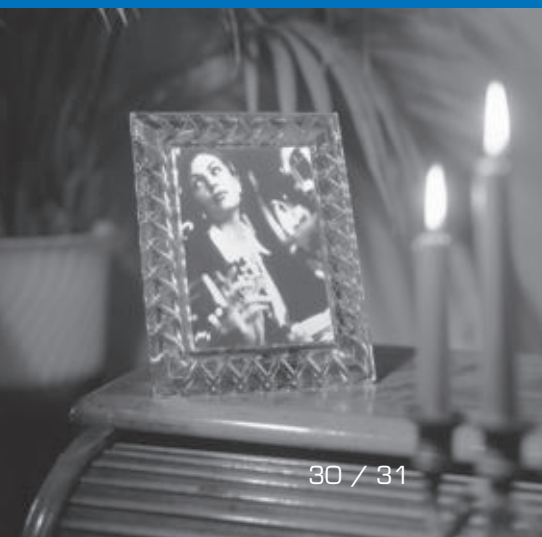
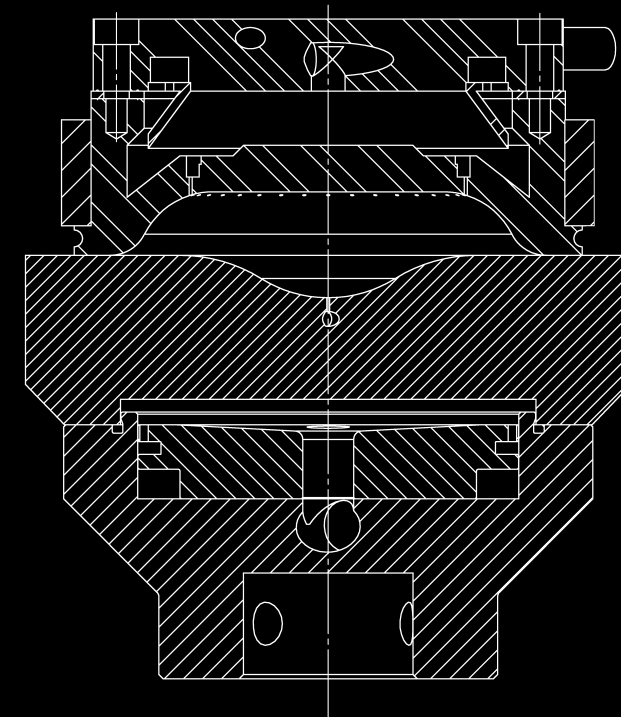


mould systems

The Forma mould systems allows the production of items with block moulds, split moulds consisting of 2-, 3-, 4- parts and basket moulds.

Unique due to Forma production technology is the possibility of production of cylindrical pressed stems, short stretched stems and pressed stems with nearly all possible designs – even perforated stems can be produced.

The Forma pre-opening mould system leads to a minimization of vacuum blisters.



Shareholders

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Susanne Ilk

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Technical Managing Director

Gerhard Steinberger

Commercial Managing Director

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