Welcome to the new Bucher Emhart Glass brochure.

Over the last few years, it’s become clear that the current economic conditions are not a passing storm, but a permanent change in the climate. Like our clients, we’ve realized that we cannot sit and wait for the sun to come out. We have to get to work.

The brochure in your hands proves our ambition to be the first-choice partner for glass container manufacturers – in service as well as equipment. With our BIS technology now proving its worth in active production, we truly have a forming machine for every business, every strategy, and every plant. Whatever balance of volume, flexibility, and economy you want to achieve, we have a machine that can deliver it.

At the cold end, our state-of-the-art inline and statistical inspection equipment helps you deliver the quality that your customers demand – and spot production problems earlier too, reducing your costs.

Everything is backed up with parts, field and remote service, repairs, maintenance kits, training, and production assistance. In fact, rather than specifying a machine, many customers now ask us for an inclusive ‘machine plus service’ package that will deliver a certain level of production. And we are happy to provide it.

The best machine is nothing without its operator, and health and safety is rightly a growing priority. On page 7 you can read about the international standards that guide our work in this area.

Thanks for reading. Whether you are a new or a returning customer, we look forward to working with you.

Martin Jetter
President
The heart and soul of Bucher Emhart Glass

Our vision is a world with glass as a dominant and preferred ecological material, enabled by Bucher Emhart Glass as the leading technology provider. Our mission is to support our customers in their quest for sustainable profitability, quality and increased market share in the packaging industry through our automation solutions. As we work to realize our vision and mission, we are guided by five key values that touch every part of our company: stability, internationality, total approach, investment and partnership.

Stability When you choose Bucher Emhart Glass, you are choosing a partner with decades of proven stability and professionalism from the smallest to the largest projects. At every step of the journey, you will feel the reassurance of dealing with a true market leader. With a century of success behind us, we are well established as a global leader in our industry – and we are still growing, as part of thriving multi-billion group Bucher Industries. We base our continuing success on adding value for our customers and helping our people to fulfill their potential.

Internationality Wherever you go, we are there. And if we are not, we will follow you. Headquartered in Cham, Switzerland, Bucher Emhart Glass is present on all five continents. Our international network means we can always be there for you with sales, service and support at the right time and in the right language.

Total Approach We do not just supply machines. We deliver solutions. As well as a true ‘end to end’ product range, we also offer informed advice, production support and technical assistance. Whatever you want to achieve with your new or existing glass production setup, we have everything it takes to make it happen – under one roof.

Investment Our success has been built on innovation. Because we know our future growth depends on yours, we invest significant resources and effort in finding the innovations and improvements that will shape tomorrow’s glass production. As well as continuing to improve efficiency, ease of use and reliability, we are also exploring ecological priorities such as energy economy, machine recycling, and reduced cost of ownership.

Partnership Many promise partnership, but few deliver. For us, partnership means providing the best possible return on investment for you and your customers. With a combination of careful analysis, customization and integration, we will put together a solution that offers the capacity, efficiency and reliability you need. And we will support you with fast, responsive after-sales service.
Health and safety

Health and safety are key issues for Bucher Emhart Glass. As a supplier to the glass industry, it is important for us to develop equipment which makes work safe and provides good working conditions for our customers. What does this mean for the daily work of Bucher Emhart Glass?

As a supplier we conform to the Machine Directive 2006/42/EC. The Machine Directive is an agreement within the European Union how to unify the health and safety regulations among the member countries. The directive is incorporated into the laws of every member country and specifies the requirements and responsibilities for suppliers of machinery. In addition to the Machine Directive, Bucher Emhart Glass works towards the Feeder and IS C standards, EN 13042-1, and -3. A number of other international and European standards are used for the design of our machines. Bucher Emhart Glass is dedicated to fulfilling national and international laws and regulations with respect to health and safety.

In our product portfolio we explain our services and products related to health and safety.
Container forming

Bucher Emhart Glass has the world’s most comprehensive product portfolio for glass container manufacturing. Whatever our customers’ requirements, we have the perfect products to meet or exceed their needs.

Machines currently available include:

**NIS machines**
The most productive, flexible, and energy efficient machines available today. Fully servo machines that are easily converted between double, triple and quadruple gob. NIS machines achieve the highest levels of productivity and flexibility.

**BIS machines**
The latest servo BIS machines focusing on small and midsize container production, providing highest flexibility and performance, enabling fast job changes, process and center distance changes thus combining the best of NIS and AIS.

**AIS machines**
The proven class leader in pneumatically-driven machines, with the famous parallel mold open and close mechanism and ability to change easily from DC ↔ TC.

**IS machines**
Highly customized conventional machines available in four different double gob center distances, three triple gob center distances, and single gob.
Container forming machines

For producers of glass containers the competitive situation today means that the highest quality of machinery with the maximum productivity and minimum downtime is a prerequisite for success. As ecological awareness in consumers grows, the industry has to respond with lighter and stronger products.

With our large range of machine types, and our tradition of investment in automation and controls, Bucher Emhart Glass is the perfect partner for success. We continue to invest in cooling technologies, parison forming technologies, delivery systems and new forming processes, to make certain we lead the market in helping our customers to produce the highest quality container at the lowest cost.
NIS machine

The servo electric driven NIS machine is the high performance forming solution from Bucher Emhart Glass. The servo mechanism technology ensures that the NIS machine outperforms traditional IS machines through better and precise motion control, perfect repeatability and faster and more precise setup time.

The use of servo electric motors reduces not only the noise level of the machine, but also significantly lowers the energy consumption.

The extended center distances of 5" TG, 95mm QC, and 6¼ DG, together with the conversion features DG<>TG<>QC make the NIS a flexible, high performance machine.

**Standard features**
- FlexIS TS control system
- Servo electric gob distributor
- Constant Cone delivery system
- Pneumatic Control Module PCM
- Blank side with FPS valve technology
- Quick change plunger mechanism
- VertiFlow blank mold cooling RH/LH
- VertiFlow blow mold cooling
- Neck ring cooling RH/LH
- High/low dead plate cooling
- Pocket air fingers
- Conveyor with silent chain
- Automatic lubrication system with 4 zones
- Vacuum assist blow side
- Machine Control Unit MCU

**Servo electric mechanisms for:**
- Blank Mold Open and Close MOC
- Baffle mechanism
- Invert mechanism
- Blow Mold Open and Close MOC
- Blowhead
- Takeout mechanism
- FlexPusher

**Optional features**
- VertiFlow blank mold cooling (DG, TG)
- VertiFlow Assist
- Vacuum assist blank side
- Variable Center Distance tong head VCD (TG, QC)
- Integrated dead plate guide air
- Plunger Process Control PPC (enabling closed loop control)
- Temperature Control System TCS (enabling closed loop control)

**NIS**

<table>
<thead>
<tr>
<th></th>
<th>5¼” Double gob</th>
<th>5” Triple gob</th>
<th>95 mm Quad gob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height under finish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>95 mm</td>
<td>75 mm</td>
<td>75 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>365 mm</td>
<td>345 mm</td>
<td>345 mm</td>
</tr>
<tr>
<td>Body diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>121 mm</td>
<td>121 mm</td>
<td>121 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>48 mm</td>
<td>83 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td>Finish diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>48 mm</td>
<td>70 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td></td>
<td>83 mm</td>
<td>70 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td></td>
<td>50 mm</td>
<td>35 mm</td>
<td>38 mm</td>
</tr>
</tbody>
</table>
BIS machine

BIS will be the future industry standard, replacing the pneumatic IS machine types 4¼", 5" and 5½". One BIS machine has a ware range which covers almost the complete ware range of the respective pneumatic machines. Existing molds, using specific adaptations, can continue to be used which results in a low transition cost. The first two 12 section 140 mm (5½") BIS machines are under glass.

Standard features
- FlexIS TS control system
- Servo electric gob distributor
- Constant Cone suspended delivery
- Parallel blank and blow mold
- Flex pressure systems
- Quick change plunger mechanism
- Automatic tube system with 4 zones
- Pneumatic control module
- Blank side with FPS valve technology
- VertiFlow blank mold cooling - 6 on/off
- Neck ring cooling - 2 on/off
- VertiFlow blow mold cooling
- VertiFlow Assist - 4 on/off
- High low dead plate cooling
- Pocket air finger
- Vacuum assist blow side

Servo electric mechanisms for:
- Blank Mold Open and Close MOC (single motor)
- Baffle mechanism
- Invert mechanism
- Blow Mold Open and Close MOC (single motor)
- Blowhead
- Takeout mechanism
- FlexPusher

Optional features
- Special adaptors to use up existing molds (Type 4¼" DG, 3" TG, 5" DG, 85 mm TG, 5½" DG)
- Funnel mechanism (servo)
- Blow side VertiFlow assist cooling
- Vacuum assist blank side
- Integrated dead plate guide air
- Plunger Process Control PPC (enabling closed loop control)
- Temperature Control System TCS (enabling closed loop control)
- Lifting device

<table>
<thead>
<tr>
<th>BIS</th>
<th>140 mm Double gob</th>
<th>95 mm Triple gob</th>
<th>70 mm Quad gob</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B&amp;B</td>
<td>P&amp;B</td>
<td>NNFB</td>
</tr>
<tr>
<td>Height under finish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>64 mm</td>
<td>41 mm</td>
<td>45 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>342 mm</td>
<td>323 mm</td>
<td>325 mm</td>
</tr>
<tr>
<td>Body Diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum body diameter with VertiFlow cooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>102 mm</td>
<td>102 mm</td>
<td>102 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>48 mm</td>
<td>92 mm</td>
<td>38 mm</td>
</tr>
</tbody>
</table>
AIS machine

The AIS machine is recognized by the industry as the superior performer among pneumatically driven glass container forming machines.

Container quality: The unique parallel Mold Open and Close mechanism (MOC) enables more balanced cooling, improves mold equipment alignment and permits equal parison reheat. User experience shows mold wear can be reduced by up to 30%, resulting in better containers at lower cost.

Productivity: The combination of an improved pneumatic system, highly efficient VertiFlow cooling, and parallel MOC motion ensures stable operation at higher cavity rates.

Flexibility: Market demand for containers is often unpredictable. To cope with changing requirements, the AIS machine can be converted between 6¼” DG and 4¼” TG within less than a shift, providing the most cost-effective way to benefit from familiar technology with the option of Servo Electric Take Out (SETO) and Invert mechanisms.

Standard features:
- Control system FlexIS
- Servo gob distributor
- VertiFlow blank cooling, InVertiFlow blank cooling
- Quick change plunger mechanism
- Quick change accessories
- VertiFlow blowside cooling
- Constant Cushion Raffle & Blowhead (top mounted)
- Constant Cushion Invert & take out mechanism
- Constant Cone delivery
- Conveyor with silent chain
- FlexPusher
- High/low dead plate cooling
- Automatic lubrication system
- Blow & Blow BB, Press & Blow PB, Narrow Neck Press & Blow NNPB
- Center distance change DG<>TG
- FPS valve technology

Optional features:
- Servo Electric Invert (SEI)
- Servo Electric Take Out (SETO)
- FlexPressure System (FPS)
- Plunger Process Control (PPC) (enabling closed loop control)
- Temperature Control System (TCS) (enabling closed loop control)

### AIS Machine Specifications

<table>
<thead>
<tr>
<th>AIS</th>
<th>6 ¼” Double gob</th>
<th>4 ¼” Triple gob</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height under finish</strong></td>
<td><strong>S&amp;B</strong></td>
<td><strong>P&amp;B</strong></td>
</tr>
<tr>
<td>Minimum</td>
<td>110 mm</td>
<td>80 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>247 mm</td>
<td>300 mm</td>
</tr>
<tr>
<td><strong>Body diameter</strong></td>
<td><strong>Maximum</strong></td>
<td><strong>Minimum</strong></td>
</tr>
<tr>
<td><strong>Height under finish</strong></td>
<td><strong>S&amp;B</strong></td>
<td><strong>P&amp;B</strong></td>
</tr>
<tr>
<td>Minimum</td>
<td>121 mm</td>
<td>121 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>48 mm</td>
<td>105 mm</td>
</tr>
</tbody>
</table>
IS machine

The most traditional machine on the market today. The IS machine is based on the original invention from the 1920’s, and has undergone continuous development and improvement over the last 90 years.

Available in the ‘small’ section (4¼” and 5”) and ‘large’ section (5½” and 6¼”), IS machines are offered in single, double, and some in triple gob configurations.

Standard features

- Control system FlexIS
- Integrated drive system
- Servo gob distributor
- Delivery Suspension System DSS
- Quick change plunger mechanism
- Quick change accessories
- VertiFlow blowside cooling
- Constant Cushion invert
- Constant take-out mechanism
- Conveyer with silent chain
- FlexPusher
- High/low dead plate cooling
- Automatic lubrication system
- Blow & Blow BA, Press & Blow PB, Narrow Neck
- Press & Blow NNPB
- Process change SG<=>DG or SG<=>DG<=>TG
- FPS valve technology

Optional features

- VertiFlow blank cooling
- InVertiFlow blank cooling
- Servo Electric Invert SEI
- Servo Electric Take Out SETO
- FlexPressure System FPS
- Constant Cushion blowhead
- Plunger Process Control PPC
- Temperature Control System TCS
- FPS valve technology

IS Type IS 4 1/4” Type IS 5” Type IS 5 1/2” Type IS 6 1/4”

<table>
<thead>
<tr>
<th>Blow and Blow</th>
<th>Type IS 4 1/4”</th>
<th>Type IS 5”</th>
<th>Type IS 5 1/2”</th>
<th>Type IS 6 1/4”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. height under finish</td>
<td>341 [355] [a]</td>
<td>341</td>
<td>344</td>
<td>300 [150]</td>
</tr>
<tr>
<td>Min. height under finish</td>
<td>61</td>
<td>58</td>
<td>59</td>
<td>74</td>
</tr>
<tr>
<td>Max. body diameter</td>
<td>179</td>
<td>90</td>
<td>52</td>
<td>178</td>
</tr>
<tr>
<td>* with stack cooling</td>
<td>179</td>
<td>90</td>
<td>52</td>
<td>178</td>
</tr>
<tr>
<td>* with VertiFlow cooling</td>
<td>156</td>
<td>76</td>
<td>51</td>
<td>156</td>
</tr>
<tr>
<td>Max. finish diameter</td>
<td>48</td>
<td>48</td>
<td>30</td>
<td>48</td>
</tr>
<tr>
<td>Press and Blow</td>
<td>Type IS 4 1/4”</td>
<td>Type IS 5”</td>
<td>Type IS 5 1/2”</td>
<td>Type IS 6 1/4”</td>
</tr>
<tr>
<td>Max. height under finish</td>
<td>265 [282] [a]</td>
<td>282</td>
<td>268</td>
<td>265</td>
</tr>
<tr>
<td>Min. height under finish</td>
<td>74</td>
<td>40</td>
<td>47</td>
<td>74</td>
</tr>
<tr>
<td>Max. body diameter</td>
<td>179</td>
<td>90</td>
<td>52</td>
<td>178</td>
</tr>
<tr>
<td>* with stack cooling</td>
<td>179</td>
<td>90</td>
<td>52</td>
<td>178</td>
</tr>
<tr>
<td>* with VertiFlow cooling</td>
<td>156</td>
<td>76</td>
<td>51</td>
<td>156</td>
</tr>
<tr>
<td>Max. finish diameter</td>
<td>120</td>
<td>81 [a]</td>
<td>38</td>
<td>120</td>
</tr>
<tr>
<td>Narrow neck press and blow</td>
<td>Type IS 4 1/4”</td>
<td>Type IS 5”</td>
<td>Type IS 5 1/2”</td>
<td>Type IS 6 1/4”</td>
</tr>
<tr>
<td>Max. height under finish</td>
<td>N.A.</td>
<td>282</td>
<td>268</td>
<td>N.A.</td>
</tr>
<tr>
<td>Min. height under finish</td>
<td>N.A.</td>
<td>40</td>
<td>47</td>
<td>N.A.</td>
</tr>
<tr>
<td>Max. body diameter</td>
<td>N.A.</td>
<td>90</td>
<td>52</td>
<td>N.A.</td>
</tr>
<tr>
<td>* with stack cooling</td>
<td>N.A.</td>
<td>90</td>
<td>52</td>
<td>N.A.</td>
</tr>
<tr>
<td>* with VertiFlow cooling</td>
<td>N.A.</td>
<td>76</td>
<td>51</td>
<td>N.A.</td>
</tr>
<tr>
<td>Max. finish diameter</td>
<td>N.A.</td>
<td>38</td>
<td>38</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

The specified ware ranges are valid when using standard mold equipment, Q/C plunger mechanisms, through bed/through frame VertiFlow bottom plate mechanisms and blank mold stack cooling (including 45 and 60 which have a standard VertiFlow blank side cooling)

* with blow mold stack cooling using non VertiFlow adapter
* with blow mold stack cooling, with or without non VertiFlow adapter
* 70mm max. finish with VertiFlow blow mold cooling

*a) with blow mold stack cooling using non VertiFlow adapter
Health and safety

Health and safety is a key issue for Bucher Emhart Glass as a supplier to the glass industry. It is important for us to develop equipment which makes work safe and provides good working conditions for our customers.

We continually strive to improve the safety of Bucher Emhart Glass machines, and today all IS and AIS machines are equipped with features that allow operators to make section interventions, job changes, and repairs more safely, quickly, and easily. In addition, safety features have been implemented that deliver safer blow side operation and maintenance. New safety features can be retrofitted on existing machines.

Bucher Emhart Glass’ safety innovations confirm our ongoing commitment to making our machines safer, as well as more effective. Instead of relying on operators’ own vigilance and skill, we aim to ‘design out’ the possibility for accidents to occur. That way, operators can put more effort into optimising production speed and quality while enjoying a safer workplace.

The most important thing to avoid accidents and negative health impacts is to know how to operate our machinery. Bucher Emhart Glass has training facilities in Europe, Asia, and North America where customers are trained to operate the machinery in the most optimal way.

Gob distributor guard

**Hazard** Activating feeder, shear or gob distributor maintenance stop will retract the gob distributor. If an operator is working in the area where the gob distributor retracts, there is a risk of being hit by the gob distributor or getting pinched between the gob distributor and the beam structure.

**Avoid hazard with gob distributor guard** The guard is designed to inform and hinder access to the dangerous zone. It is light and can be easily removed. The fasteners are attached to the guard.

Override switch protection

**Hazard** When an operator performs maintenance on a pneumatically operated IS section there is a risk that the override pneumatic switches on the valve block could be activated unintentionally when the operator stands close to the valve block.

**Avoid hazard with protection guard for of override switches** The U-shaped channel minimizes the risk of unintended activation of the override switches. The U-shaped channels are standard on the Bucher Emhart Glass pneumatic valve block. They can be retrofitted on the 261 EPVB.

Safety flaps

**Hazard** When work is performed on both blank and blow sides of the IS section, there is a risk that the operator on the blank side could activate an override switch controlling a mechanism on the blow side. The operator on the blow side could be hit by the moving parts or get limbs crushed (two hands operation.)

**Avoid hazard with safety flaps** The EVPB valve block safety flaps alert the operator on the blank side about the risk of overruling mechanisms and risking the safety of an operator on the blow side. The safety flaps are available in different lengths for retrofit. On the standard Bucher Emhart Glass EPVB invert/invert, blow head and blow molds are covered by the safety flaps.
Blow head and blow mold interlock

**Hazard** The operator on the blank side of the machine may mistakenly activate the movement of the mechanism on the blow side of the machine by activating blow head or blow mold override switches when the section is in the maintenance stop. The operator on the blow side could get pinched or have limbs crushed.

**Avoid hazard with blow head & blow mold interlock** The blow head & blow mold interlock gives the operator on the blow side of the machine control of the blow head and blow molds. The switches lock the mechanisms in the up and open position and indicate the status of these mechanisms very clearly.

Conveyor ladder

**Hazard** Performing exchange of accessories on the blow side of the section requires that the operator leans over or has to climb over the flow of hot containers on the conveyor belt. There is a risk the operator will get burns performing this operation. The working position is ergonomically cumbersome.

**Avoid hazard with conveyor ladder** The conveyor ladder is designed to enable easy and safe service on the blow side (mold halves, blowhead, blowhead arm, bottom plate, TO tong, and TO head change) by providing a robust ladder with a thermal insulated ‘tunnel’ and integrated footstep to assist the maintenance work. FlexConveyor with steel girder has an integrated conveyor ladder.

Lifting device on the blank side

**Hazard** Performing the exchange of accessories on the blank side can require cumbersome working positions with heavy lifts. In long term this can result in repetitive strain injuries.

**Avoid hazard with Lifting device** The lifting device is designed to help the operator to avoid heavy lifting and cumbersome working positions. It has a maximum lifting capacity of 125 kg.

Lamps for section illumination on the blank side

**Hazard** Good visibility of the section is essential to minimize the time the operator needs to work in the hot environment.

**Improving working conditions with the LED lamp overhead panel** LED lamps on the blank side overhead panel light the section and make the accessory exchange, job change etc. easier to perform.

Blank Side Barrier (development)

The Blank Side Barrier BSB is an addition to all IS machines that helps to provide additional safety during the forming operation.

- During normal operation the barrier is in the up position. The visibility of operating mode of the section increases and the risk of reaching into the operating section is reduced.
- The up position of the BSB during normal operation will eliminate the risk of ‘swabbing on the fly’ on the blank side of the machine, where the operator reaches into the running section to swab the blanks.
- The BSB, in conjunction with a swabbing cycle on the timing system (manually operated), helps to reduce risk while swabbing the blanks on the blank side of the IS machine. BSB will clearly indicate for the operator if a section is in swab cycle or not. The risk of swabbing a section which is not in swab cycle is eliminated.
- The up position of the BSB during normal stop will decrease the risk of an operator interacting with the section without activating the maintenance stop which is the only stop that allows the operator to interact with the machine.
- When the maintenance stop is activated (blank or blow side), the BSB is down and it will clearly indicate that it is safe to interact with the section.
Gob forming systems generate out of the continuous glass flow from the forehearth a constant gob in weight and shape which is required for processing in the IS machine. The feeder plunger, tube height and rotation and the shear mechanism form a gob which is tailor-made for the container to be produced in the forming machine. Errors made in this process step cannot be corrected afterwards in the forming of the container. This is the reason why the gob forming is a key factor of the quality of the finished product.

Superior gob forming technology

Bucher Emhart Glass has perfected the process of gob forming to turn streams of molten glass into the shapes that will be molded into the finished container. Our complete product line includes feeders that offer wide operating ranges for simplified operation. Feeder deflectors are designed to ensure uniform, consistent, and repeatable gob guidance and delivery. Delivery and support systems provide precise alignment for smooth and centered gob transition into the mold which is essential for high ware quality. The spout system consists of an entire set of spout refractory components specially designed to promote optimum gob forming conditions.
Servo Feeder System

The Servo Feeder System offers the ability to improve production quality and customize the gob forming. The 555 system includes the feeder plunger, tube height and rotation and the shear mechanism as well as the optional metering spout system. The metering spout features reduced servo tube sensitivity and improved thermal and weight variations. This degree of control with the servo-driven gob forming equipment reduces glass loss and optimizes feeder and shear performance. The Servo Feeder System is available fully integrated into the FlexIS process control system and also as a standalone version which interfaces with existing non FlexIS timing systems.

Features and benefits
- Improves gob forming and loading at rates from 1 to 240 cuts/minute
- Speeds job changes and allows quick save & recall of all critical job information
- Provides high torque needed to make custom feeder plunger motions
- Improved gob weight control

Specification
- Covers tonnage ranges from 5-200 m TPD
- Fits 81, 503, 515 and 585 spout assemblies
- Advanced servo technology
- Cut rates from 1 to 220 cuts/minute
- Software cam profiles can be adjusted while feeder is running
- Includes metering spout system for reduced tube sensitivity, improved thermal and weight variations, improved loading
- High dynamic servo motors for precise plunger motion
- Bucher Emhart Glass standard FlexIS technology
- Installs into new or existing applications
- Available with standalone or integrated controls

570 Feeder Plunger
- With the general increase in machines operating in triple gob and quad gob format, the need for a feeder plunger which can control the shape and the weight of the individual gobs has been realized. With improved controls and monitoring of gob shape, the new 570 plunger mechanism has the added benefits of:
  - Direct motor drive
  - Mechanical spring plunger assist system

565 Shear
- Parallel shear motion
- Synchronized cutting forms consistent gob shapes and weights with reduced shear marks
- Improves gob loading
- Minimal contact time lengthens blade life and reduces shear spray consumption
- Universal mounting design, simplifies installation and reduces mechanism spare parts

Gob distributor and delivery

The gob distributor and delivery system on an IS machine receives the gobs after the shear cut, for delivery to the individual sections of the machine. The gob distributor moves the scoops with high speed and accuracy to the entrance of the troughs in accordance with the firing order. The motion and the resulting dwell time of the scoops are important for smooth transition of the gobs into the troughs. The Bucher Emhart Glass gob distributor has proven to be a very reliable and low maintenance mechanism. The reject system with both gob interceptor and center reject chute increases the safe operation of the machine.

The Bucher Emhart Glass delivery equipment covers a wide range of scoop, trough and deflector sizes to permit gob weights from a few grams to over 1 kilogram to be delivered correctly to the section. With the introduction of the delivery suspension system, a truly individual optimization adjustment of the delivery can be achieved. Together with the 18000 Series deflectors, the suspended delivery system provides an accurate vertical gob drop into the blank mold.

535 Gob Distributor
- Available in all configurations
- Universal drive module with exchangeable distributor heads
- Fast scoop motion up to 140 ms permitting in excess of 200 cuts/minute
- Carbon plate gob interceptor
- Center reject shoot
- Redundant gob reject for increased safety
- Suspended delivery and delivery equipment
- Suspended delivery system with individual adjustment
- Precise CNC machined scoops
- Long life coated aluminum scoops
- Universal sizes for a wide application range
- Precise CNC machined deflectors
- Accurate vertical gob drop into blank mold
- Multi gob weight system

Options
- Multi gob weight system
It is clearly understood that one of the key factors in improving pack-to-melt and container quality is the kinematics of the IS machine, which must be reliable, mechanically precise and fully controlled. However, the stability of the forming process itself is becoming ever more recognized as vital for excellent quality and superior performance which result in reduced container costs. The high variations and fluctuations can now be managed with the Bucher Emhart Glass Process Product line.

Process products

Container forming is the heart of the glass container process, where the gob is manipulated and pressed or blown into its final form. Different techniques are used to make different types of containers. Both processes comprise a blank side, where the gob is formed into a partially completed form known as a parison, and the blow side where the final shape is achieved.

Bucher Emhart Glass machines have features for optimum handling and forming to ensure consistent quality and uniformity whether a single gob machine running slow volumes to quad gob high speed production.
Cooling

Mold cooling is a key process to cope with current market demands including production speed, flexibility, quality and lightweighting. A predictable and efficient cooling system is a must to accomplish a good container quality and an elevated production speed. Such a high efficiency cooling offers also more production flexibility, especially as far as special shapes are concerned. The available service tool TekPak calculates the 3D mold glass contact temperatures and ensures predictability based on mold and process parameters. In addition, a successful cooling system has to serve different needs on the blank and blow sides.

Blank side

The final container glass distribution is primarily set by the blank mold temperature profile and the resulting parison quality. Therefore a predictable, adjustable and stable blank mold temperature grid is vital to achieve a high container quality. The blank cooling is in fact a parison conditioning system.

Parison conditioning = glass distribution

VertiFlow

- Efficient cooling air utilization = energy savings
- More constant potential predictable mold temperature
- Production speed increase
- Less job-change and production downtime
- Noise reduction

VertiFlow through the bed

- High cooling capacity
- Individual cooling air pressure for blank and blow mold cooling is possible
- Simple, maintenance friendly design
- Less mold surface temperature variation
- Upper support brackets interchangeable with Series 9700 mechanisms

InVertiFlow

- Higher cooling efficiency → speed increase potential
- Individual cooling of molds → optimized cooling conditions
- Fumes and heat carried away → improved operator environment
- Easier mold change → reduced downtime

VertiFlow assist on AIS

- Addition to the efficient VertiFlow cooling
- Higher cooling efficiency 360° resulting in higher speed
- Extra cooling on specific critical areas
- Independent control through left and right on/off control
- Up to 20% higher cooling capacity
- Upgrade on existing AIS machines possible

Blow side

On the blow side, cooling leads to the stability of the container. This stability defines the production speed. The cooling capacity has to be predictable and high. It is also important to use cooling wind as efficiently as possible and not to waste energy.

Mold contact time = stable containers
Container forming

Parison formation is the most critical step in the production of glass containers. In Narrow Neck Press & Blow NNPB and Press & Blow PB, weight control and the motion of the plunger are critical in producing high quality containers. The Plunger Process Control PPC system visualizes and displays the actual plunger stroke providing vital information to optimize the container quality.

FPS technology provides programmable pressure control for the plunger movement and plunger cooling/counterblow. This technology increases accuracy and reduces variation in the parison formation. Combining the PPC with FPS technology offers the ultimate in control for optimizing parison forming. Recent development of the PPC technology has enabled the plunger operation in Blow & Blow BB to be monitored and displayed. This has shown to be a useful aid in monitoring wear, alignment and lubrication in the production of Blow & Blow BB containers.

Plunger Process Control PPC

The Bucher Emhart Glass Plunger Process Control system PPC is a product which monitors individual plunger motions during the parison forming process. The system uses full stroke sensors and a unique method to eliminate cabling in the plunger mechanism.

As well as measuring plunger stroke in the NNPB and PB process, gob weight is automatically controlled, with closed loop technology to adjust tube height and individual plunger needles in the feeder.

The display shows by cavity the full plunger stroke profile allowing optimization of the press time and plunger up profile. All profiles are stored electronically and all data is easily displayed.

Most recent developments included plunger position profiles for BB process, allowing a visualization of the plunger operation for the first time. All the features enable the production specialists to optimize the forming process, reduce variability and improve quality.

PPC features
- Full stroke motion tracking
- Gob weight control
- Wireless sensor connection
- Hot End Ware Reject HEWR
- Process data collection and storage
- Advanced diagnostic tools
- Support of all processes NNPB, BB and BB
- Status visibility with large LED display

Configuration
PPC is available for the following quick change plunger mechanisms
- 4¼” DG
- 5” DG
- 85 mm TG - 5” DG quick conversion
- 5½” DG
- 6¼” DG (IS/AMIS/NIS)
- 4¼” DG (IS/AMIS)
- 4V” TG - 6¼” DG quick conversion
- 5” TG (NIS)
- 95 mm QC (NIS)
- BIS 140 mm DG, 95 mm TG (70 mm QG)
FlexPressure System FPS

The Bucher Emhart Glass FlexPressure System FPS is technology to optimize and program the pneumatic process function on the forming machine. On the parison formation, FPS is a well accepted technology for plunger up control and plunger cooling/counterblow optimization. Always standard on the NIS machine, the FPS technology is a standard option on IS/AIS machines. Latest application of this technology is on final blow and finish cooling.

New valve designs are now available to allow programmable FPS technology to be applied to the final blow. This allows for increases in productivity and quality. With the FlexIS forming control the optimization of pressure profiles are job dependent and stored as part of the job set up data.

Features and benefits

• Automatic pressure control
• Quick response to pressure changes
• High air flow
• Maximized cooling time and efficiency
• 4 different pressures in one cycle
• Tailored pressure for each process step
• Job related setting
• Testing and repair features

Valve type application

ED 02 Pilot for regulators
ED 07 Plunger up
ED 12 Counter blow
ED 19 Final Blow
Finish cooling
Settle blow

Temperature Control System TCS

The Bucher Emhart Glass Temperature Control System TCS is a pyrometer based system which monitors mold equipment on the blank side of the forming machine.

Mounted on a rail in the region of the blank side panel, the pyrometer is capable of being programmed to measure and display individual blank temperatures, blank temperature vertical profiles, plunger temperatures, and neck ring temperatures.

These temperature readings give the process transparency needed to reduce blank mold, plunger and neck ring temperature variations and can lead to improved process stability. The collected data is plotted on various graphs and a warning is activated if any of the temperatures falls outside the predetermined set limits. On new IS machines the TCS system is fully integrated and is hidden behind the blank panel without interfering with the machine operator. Upgrading existing IS machines in the field can be done and may require a prior installation review on site.

Features and benefits

• Simple set up using integrated laser
• Warnings and alarms for out-of-range
• Storage of data
• Automatic swab detection
Ware handling

Hot end ware handling has to ensure the stable transport of the still hot and fragile containers from the IS machine into the lehr. This is the part of the production process where good ware can only be lost or damaged and the speed as well as the efficiency of the entire production line can be limited.

Ware handling

Good ware handling improves significantly the stability of operation on any production line. During the start up of a machine the hot end transport should work without any intervention of the operating personnel. This improves start up time and allows the production specialists to focus on the important forming issues.

The advanced ware handling system supports the flexibility of IS production lines with smart variable parts like pusher fingers and low maintenance requirements on the equipment like the pusher mechanism or the conveyor belt. The ware handling system must operate consistently and without the need for operator adjustments.
Servo Electric Take Out SETO

The Servo Electric Take Out SETO picks up the containers from the blow mold, moves them over the dead plate for cooling and afterwards releases the containers on the dead plate. A backlash free pickup and a smooth transfer is essential to avoid damaging the sensitive hot containers. Increasing production speeds require tight control of the take out motion with dynamic servo motors.

The belt-driven take out arm connects the gear box with the Tong Head. The belt provides a play-free motion and very low maintenance cost. Tong head is available in every center distance of the Bucher Emhart Glass machine portfolio and in addition as Variable Center Distance VCD Tong Head.

The SETO can be retrofitted to existing machines to reduce defects and improve the performance of the ware handling.

Features
• Servo controlled
• Compact design
• Front mounted safety lock, tong close speed adjustment and take out height adjustment
• VCD Tong Head to reduce ware spacing and belt speed
• Fully integrated into the FlexIS
• Upgrades with FlexIS standalone on existing lines
• Gearbox running in oil bath

Benefits
• Precise motion control and adjustment with the FlexIS process control system
• Good access into section
• Easy handling
• HS Ware handling ware handling TG/QG
• One control system
• Available for all machine configurations on the market
• Low maintenance

FlexPusher

The FlexPusher mechanism transfers the containers from the dead plate onto the running conveyor. It combines the motion of two independent servo motors to generate the sweep out motion. The motion can be modified by changing parameters on the pusher page of the FlexIS control.

The unique motion of the FlexPusher uses all available space on the dead plate for a smooth sweep out motion and opens the door for conveyor speeds which were not possible before. The motion of the pusher determines the placement of the containers on the belt which is the main factor in the performance of the downstream ware handling. Precise placement of the containers by the pusher also reduces losses at the ware transfer, the stacker, and the hot end coating tunnel. The pusher fingers of the FlexPusher are designed to be equipped with carbon finger liners. This makes these fingers very flexible and contributes to the high performance of the entire system.

FlexPusher Special Performance SP

The FlexPusher Special Performance SP is a FlexPusher extension, addressing specific high speed triple gob, non-round and unstable productions, which could otherwise restrict the standard FlexPusher ware range. Where the ware range limitation is not an issue, standard FlexPusher installations are upgradable to FlexPusher SP (and vice versa), by changing the upper housing (conversion kit 904-12/16). The FlexPusher SP is so far not available on NIS machines due to the larger 22.5” section width.

Features
• 2 axis fully servo controlled
• No pneumatics & no lubrication
• Available for IS, AIS, HIS and NIS machines
• Fully integrated into the FlexIS
• Simple interface for motion profile adjustments - optimization made by plant personnel
• Upgrades with FlexIS standalone on existing lines
• Various finger spacings available for TG, DG TG and QG
• Flexible finger liner concept
• 2 different finger heights
• Flexible finger liner inserts
• Vertical pocket air at the back plate

Benefits
• High repeatability
• Reliable
• Standard
• One control system
• Easy set up and handling
• Fits all machine types on the market
• Standardized
• Easy to customize for special products
• Built in feature for high speed production

Additional Features
• Full parallel container positioning before going onto conveyor belt
• Same centrifugal forces for all cavities

Benefits
• Improved high speed ware handling in TG and QG
• Better handling of unstable ware (non-round)
• Reduces ware handling losses
Ware Handling Supervision WHS

The Ware Handling Supervision WHS, fully integrated in the FlexIS timing, rejects incorrectly positioned containers at the hot end. The unit uses a light barrier to detect cullet and ‘stuck’ or ‘down’ ware on the conveyor belt. An air reject system removes such ware from the conveyor before it can become the source of handling problems on the rest of the production line.

**Features**
- The WHS helps to eliminate line jams at the hot end coating tunnel and transfer wheel by sensing and removing faulty ware before it reaches these areas
- The WHS is fully integrated in the FlexIS Timing hardware

**Benefits**
- The WHS will improve packed ware quality
- The number of rejected bottles are reported on the FlexIS Production Counters PC

Dual Row

Pharma Type II sodium calcium glass containers need a surface treatment to achieve the specified hydrolytic stability. Larger and faster machines have pushed existing dosing equipment on the machine conveyor to its operating limits. The new Bucher Emhart Glass Dual Row system uses the FlexPusher and allows changing between single and dual row within minutes.

**Features**
- Easy and quick to convert from: single row <=> dual row
- Built into FlexIS
- Fits all Bucher Emhart Glass conveyors

**Benefits**
- Flexible
- Standard choice
- Universal

Ware Transfer

The Ware Transfer moves the containers from the machine conveyor to the cross conveyor. The transfer wheel has to cope with spacing variations and still transfer the containers with consistent spacing onto the cross conveyor. A smooth motion is essential to avoid damage or loss of any containers during the transfer.

Both Bucher Emhart Glass ware transfers can be driven either with a reluctance motor controlled by the FlexVector drive or by a servo motor controlled from the integrated FlexIS Ware Handling Controller WHC.

**Features**
- Reliable and simple design
- Easy to change fingers
- Transfer wheel for up to 250 containers/minute
- Precise and stable
- Pocket inserts which match the container shape

**Benefits**
- Low operation costs
- High flexibility
- Reliable container transport for high speed lines
- Simplifies job change, setup & maintenance

FlexConveyor

The FlexConveyor combines all the different customer needs. This new standard steel conveyor improves the stiffness, reduces the reach distance, optimizes the wind box for equal flow with an option for two on/off controls, integrates the pusher cables and provides a height-adjustable dead plate. To improve the ease and safety of blow side accessibility the FlexConveyor has an integrated ladder.

**Features**
- New steel girder
- Integrated safety ladder
- Dual controlled wind box
- Closer access to blowside
- Fits all Bucher Emhart Glass machines

**Benefits**
- Increased robustness
- Safe and easy access to blowside
- Balanced flow & adjustable pressure profile
- Standard
- Easier blow side swabbing
- Universal
Cross Conveyor

The Cross Conveyor has a unique cast iron girder, reducing vibrations and minimizing distortion due to the hot environment. It reduces installation service requirements (fluid cooling) and guarantees a long equipment life. The Cross Conveyor fits nearly all lehr widths and heights.

**Features**
- Cast iron main structure
- Adjustable dead plates
- Spring steel belt wear plates
- Reduced vibration
- All lehr heights supported

**Benefits**
- Increased robustness & reduced high temperature distortion; Fluid cooling not needed, no running cost for cooling
- Tilt/rocker smoother container transition
- Long girder life time
- Better container handling
- Universal

FlexStacker

The new three axis FlexStacker is a result of a joint development project. It uses the FlexlS control hardware from the lS machine. This enabled the introduction of a pioneering human interface with built-in expert knowledge, allowing easy setup of the new stacker without the need of 'specialists.' Performance is proven to handle high speed loading into the lehr.

**Features**
- 3 axis fully servo
- FlexlS control
- Newly developed user interface
- Optimized motion profiles

**Benefits**
- High repeatability
- Emhart standard
- Easy set up and handling
- High speed lehr loading
FlexIS Process Control System

Bucher Emhart Glass has reliable and innovative control systems for managing the different types of IS machines in its portfolio. There has been a quantum leap with the introduction of the FlexIS Control, a control system born from the collaboration between Emhart Glass and Jetter AG, merged now in the Bucher Group.

Knowledge in motion control solutions and technology, combined with expertise in technology and application of the Bucher Emhart Glass IS machines, make the FlexIS a powerful process control system that can manage the entire glass container forming process.

The FlexIS Control System is at the heart of a strategy that will finally bring well-coordinated and integrated process control to glass container production and the capability to interface with other current and future components – from the feeder to inspection – an integrated line concept.
FlexIS Process Control System

The FlexIS Process Control System is the core component that makes automation of the container forming process possible. In addition to controlling a forming machine, FlexIS is capable of fully driving all mechanisms from feeder to stacker. FlexIS controls are designed around state-of-the-art technology that uses ethernet for communication. Each device connected becomes a node on the network for internal and external data communication. Latest developments include closed loop control technology, giving real automation solutions to the glass forming process.

Much more than a forming control system, FlexIS was conceived as a full process control system capable of directing all of the various events and actions required to produce high quality glass containers. The FlexIS system is designed to be the neurological control center for the glass container production process.

Modular, expandable, and upgradable The FlexIS system takes into account the closed loop control strategies that will lead to considerable reductions in operator intervention and higher levels of automation. FlexIS adds a new level to glass container process control. Current capabilities include the ability to monitor and control:

- Operation of a servo-controlled feeder, plunger, shear and ware transfer
- Motion profiles and positions of all mechanisms
- Servo motor real-time status information

The system includes a simple, operator-friendly user interface with a unified look and feel that enables easy access to setup, operation, and key process reporting screens. FlexIS is the platform for further innovations in process control from Bucher Emhart Glass. Closed loop control is now available for optimized ware handling.

FlexIS TS-E

The FlexIS TS-E is a scalable and expandable control system for IS and AIS machines. The NIS and BIS have the same design concept but larger cabinets.

TS-E unifies the section, machine and ware-handling controllers into a single system. The simple, three-module configuration keeps spare parts costs to a minimum. The system is capable of controlling both pneumatic and servo-electric devices, and can also mix analogue and servo valves within the same event. TS-E can control a maximum of 12 sections, or as many as 24 in tandem configuration. For WHC the new motors are adapted to the existing drive components including existing gearbox.
Cabinets and controls

TS-E is housed in two different cabinet types: one type for the machine controller and ware handling controller, and one for the section controller. Communication and synchronization are via TCP/IP over ethernet, which allows remote access and control via the internet, if required. The system has a CAN open bus connection for configuring devices.

Machine Controller/Ware Handling Controller cabinet: The machine controller drives the five gob-forming servo motors, ensuring precise and controlled motions for tube station, tube height, feeder plunger, shear and gob distributor. The ware handling controller manages the various servo motors involved in smooth container handling: conveyor, ware transfer, cross conveyor and stacker. In addition, the ware handling controller can control:
- Conveyor height
- Optional Ware Handling Supervision – WHS operates as stuck- and down-ware reject
- Pressure Control Unit PCU, standard for BIS and NIS and optional for IS and AIS, manages up to 12 compressed air lines of an IS machine forming process in a closed loop.

Section Controller Cabinet: Offered in three different configurations:
- TS-E for IS and AIS machine
- One section controller cabinet manages the section timing for four sections. Up to four servo drives can be added in order to support FlexPusher, SEI, SETD
- FPS control for a max of 12 channels with feedback as option is integrated in the section control
- FlexIS NIS 12.0 designed for NIS machine
- One cabinet holds 2 sections of controls with a max of 12 drive per section and the FPS with feedback
- FlexIS BIS 9.0 designed for BIS machine
- One cabinet holds 2 sections of controls with a max of nine drives per section and the FPS with feedback.

Human Machine Interface: The best technology is nothing without effective control. On TS-E, operators use a Human Machine Interface HMI comprising the Universal Console UC, the Hand Held Terminal HHT, blank side panel, blow side panel, feeder operator station and ware handling control operator station.

UC runs on a standard Windows PC with a touch screen, housed in an air-conditioned cabinet. The FlexIS software features ergonomic pull-down menus for rapid navigation, allowing operators to quickly set the desired parameters or import/export job files. It provides alarms in the event of problems plus reports on status, production and downtime. Servo axis parameters are shown as intuitive graphics, showing theoretical and real curves. UC’s multi-language database allows operators around the world to use it in their first language.

HHT gives an operator near the IS machine instant access to the key functions covered by the UC – viewing and changing setup parameters, viewing input status, activating mechanisms and troubleshooting. The blank side panel is located overhead on the blank side of the section, while the blow side panel is located on the conveyor in front of each section. These two panels feature switches and buttons with functionality clearly indicated with pictograms. Operators can override or disable each mechanism individually, to allow manual operation, initiate an automatic calibration cycle for all the section’s servo mechanisms or activate special cycles including cold blank/blow cycle, manual swab, delivery request, normal stop and blow side special cycle. The feeder operator station provides an interface for all the feeder’s servo mechanisms: feeder, tube, shear and gob distributor. The user can optimize settings for the gob forming axis and gob delivery. Finally, the ware handling control operator station facilitates management of all ware handling servo motors.

Standalone control systems

FlexIS Standalone S4.0: Allows integration of Bucher Emhart Glass servo mechanisms on existing machines not equipped with FlexIS or possibly with timing systems from other manufacturers. Now any standalone configuration can be realized, including pusher (BIS or FlexPusher), Servo Invert SEI and Servo Takeout SETD, on lines with six to twelve sections. Standalone systems are controlled via an LCD touch screen with function keys. Connectivity is via an ethernet interface. Each mechanism has a local disable switch, and there is also an overall E-stop.

Features:
- Modular and expandable, same parts as FlexIS TS-E
- Ethernet communication and remote access through internet
- Available for machine upgrades

Benefits:
- Simple installation
- Specific optimized motion profiles stored on the job file
- Simple motion profiles adjustments

We can help clients old and new to make a truly future-proof investment in state-of-the-art glass manufacturing controls. The current Bucher Emhart Glass controls portfolio fulfills all customer needs for a flexible, scalable, best fit control system that allows seamless and straightforward future expansion.
Over the last few years, Bucher Emhart Glass has invested in research using infrared imaging technology. This area of research focuses on the forming process and glass distribution throughout the container. Data collected from this research has led to the development of the FlexRadar system.

This glass forming process analyzer quickly identifies deviations in the glass forming process by monitoring each container’s glass distribution and geometry as well as its position on the conveyor.

**Reducing real time process variations**

The FlexRadar system incorporates Short Wave Infrared Imagers SWIRs positioned directly after the IS machine on opposing sides of the conveyor. These SWIRs provide images of the sidewall of each container for maximum coverage and improved dimensional profiling of each container.

The images produced by the SWIRs are processed using proprietary algorithms to identify cavities that stand out from the overall population of all cavities. The deviations used to identify the outliers are based on the containers’ vertical and horizontal glass distribution, dimensional outline including lean, and the position on the conveyor. Cavities or sections producing outlying containers are quickly identified and visually displayed to the machine operator.

Development of additional features for the FlexRadar system continues at the Bucher Emhart Glass research center. The focus is on closed-loop controls by exchanging container information with the FlexIS machine control. These developments are aimed at automatically reducing process variations during container forming.

---

**FlexIS Multi Gob Weight System**

The Multi Gob Weight System provides long desired capabilities like sampling a different glass container on one section without affecting the commercial production on the other sections.

**Offers today’s required flexibility**

Unprecedented production flexibility can be achieved by operating the S55 Feeder and S65 Shear with the new Bucher Emhart FlexIS Multi Cam/Multi Shear software. This permits each section of a forming machine (IS, AIS, NIS or BIS) to produce items with different gob weights and shapes. The advantages of such a system are many:

- Production can be very closely coordinated with demand, both in time as well as in quantities. This optimizes machine utilization and minimizes stock.
- To accommodate a short-notice job, it is no longer necessary to halt an existing run. Some of the sections can continue, while the remainder can be changed to one or more new jobs.
- For low-quantity production runs, it is not required to equip the entire machine with molds, or to leave some sections standing idle.
- This application can be used to test a new set of mold equipment or to make sampling runs on a single section without interrupting the normal production.
- Production can be adjusted precisely to the supply of glass, thus optimizing the furnace output.
Closed Loop Systems

FlexIS Plunger-Up Control

FlexIS Plunger-Up Control is a new optional control loop available in the FlexIS Timing using information from the plunger process control PPC. In Press and Blow P&B and Narrow Neck Press and Blow NNPB production, it determines the time needed to move the plunger up to its end pressing position. It adjusts FPS pressures and certain FPS timing values so that the desired time to raise the plunger is maintained. Having a defined plunger rise-time means also having a defined full contact time (dwell time), which is well known to be an important process parameter.

Plunger-Up Control manages FPS pressure and timing. Until now, controlling the plunger rise time and thus the full contact time between plunger and glass was hardly done systematically for all cavities. The result depended on many influencing factors like friction in the plunger mechanism, glass viscosity, loading situation etc. Even if it was controlled systematically, pressing with only one pressure offered a limited range of possibilities to influence the plunger rise time without risking other quality issues.

FlexIS Plunger-Up Control uses multi-pressure pressing in order to have a wide range of influences on the plunger rise time. By continually adjusting the initial pressure levels and also the switch points (timing) for stepping between the pressure levels, the system makes multi-pressure pressing usable in a comfortable way without risking any quality issues.

FlexIS Blank Cooling Control

FlexIS Blank Cooling Control is a control loop, using information from the Temperature Control System TCS. Its purpose is to maintain the temperature of the blank molds at the desired value.

TCS masters the cooling timing. The TCS sends its measured temperature values from the blank molds to the FlexIS controls. Each value is then compared with the set point and a correction of the appropriate cooling duration is calculated. It is possible to influence either the ON or the OFF sub-event. As the AIS and BIS machines have 6 on/off valves per section, each cavity half can be controlled by one individual closed loop. The NIS and IS machines allow the control of each section half individually.

FlexIS Blank Cooling Control is initially designed for equalizing slow changes in production parameters. Generally the temperatures can be kept in a very narrow band with the closed loop.

Nevertheless it is possible to measure all cavity halves per side and use the average as measurement input for the closed loop.
Refractories for glassmaking

Forehearth and feeder products High quality refractories are crucial to proper conditioning of molten glass. Bucher Emhart Glass refractories are formulated specifically for the handglass industry. As a flexible, well-staffed fabricator of premium refractory compositions, our goal is to serve the individual requirements of each customer no matter what type of glass they manufacture. We deliver a level of customized service to all areas of the glass making industry is high quality refractories. Their use in forehearth and feeder mechanisms play crucial roles in the formation and conditioning of the glass prior to forming into finished products. All Emhart refractories are formulated from the highest quality raw materials and designed to achieve predictable density and resistance to erosion and corrosion. Precise PC monitoring of batching and kiln firing ensure the highest quality performance and service life.

Customer focused Our service team responds rapidly with knowledgeable assistance to help our customers eliminate downtime and maximize production efficiency. Bucher Emhart Glass continues to grow by serving the industry with time-honored craftsmanship, world-class innovation, and service to customers.

The industry’s widest range of glass refractory expendable compositions We continue to advance the state of the art in gob forming technology. One way we do this is by providing the industry’s widest range of glass refractory expendable compositions. Our bonded compositions include alumina silicates, AZS, zircon, and fused silica. We offer a full range of shapes in industry standard compositions: 301, 315, 333, 311, 338, 345, and 357. For applications demanding customized compositions, our unrivaled R&D capabilities enable us to devise formulations to achieve specific customer objectives.

Quality driven Since 1927, Emhart Glass has developed and manufactured high quality refractories for the glass container industry. The Owensville plant that now manufactures refractories was purchased in 1980 from the Laclede Christy Refractory Company, a renown refractory maker since 1844. Before becoming a refractory plant, the Owensville plant specialized in the production of glass pot refractories. Upon purchasing the plant, the company closed its other refractory operations and concentrated all production in Owensville – a setup that has been maintained to this day. Bucher Emhart Glass understands that the basis of superior glass conditioning for all areas of the glass making industry is high quality refractories. Their use in forehearth and feeder mechanisms play crucial roles in the formation and conditioning of the glass prior to forming into finished products. All Emhart refractories are formulated from the highest quality raw materials and designed to achieve predictable density and resistance to erosion and corrosion. Precise PC monitoring of batching and kiln firing ensure the highest quality performance and service life.

Exclusive refractory products for the handglass industry The ability to match our proprietary mixes to our customers’ melt and firing needs has enabled us to serve a wide spectrum of glass industries. Today, we are a leading manufacturer and supplier of glass house crucibles used exclusively in hand glass shops throughout the world. These highly specialized products demand meticulous craftsmanship. We manufacture a wide variety of shapes and sizes, ranging from one pound glass capacity open crucibles to closed pots with 500 pound glass capacity. We also offer a complete line of refractory accessory designed specifically for the handglass industry.

Quality engineered feeder and refractory expendables Bucher Emhart Glass has earned a reputation for unsurpassed quality in refractories. As a flexible, well-staffed fabricator of premium refractory compositions, our goal is to serve the individual requirements of each customer no matter what type of glass they manufacture. We deliver a level of customized service normally unavailable from other refractories manufacturers. As a division of the global Bucher Emhart Glass enterprise, we leverage the continuing evolution in glass making technology from the industry leader. We offer a full range of standard refractory shapes and manufacturer unusual, complex, and small quantity shapes to the same exacting tolerances. We also serve the optical, tableware, and float glass industries.

Bucher Emhart Glass refractories are formulated from high purity, special oxide raw materials and manufactured with the properties necessary for the success of each specific glass making operation. In our laboratory, manufacturing, and quality operations, we bring together people, processes, and products to meet your needs. Our refractory craftsmen – most with at least a decade of experience – are the heart of our operation. They are supported by engineering and R&D professionals who emphasize innovative product development and individual customer solutions.
Container inspection

Glass is truly a perfect package representing quality and value in the eyes of the consumer. To uphold its premium image, the glass container must achieve the highest standards of excellence. A company’s reputation, therefore relies on the effectiveness of the container inspection system. Bucher Emhart Glass inspection solutions verify container quality and integrity at the highest levels, combining vision inspection, software, lighting, and reject systems for optimum system performance at production line speeds.

We deliver the industry’s most comprehensive selection of empty glass inspection solutions. From base, sidewall, finish and stress inspection to mold correlation and check detection for glass containers in all sizes, shapes, colors, and configurations, Bucher Emhart Glass inspection systems perform all these critical inspection tasks at production line speeds.

Our systems offer exceptional flexibility with quick product changeover, ease of operation and maintenance, and concise, real-time data generation for production analysis and trending. Our systems are intelligently designed for ease of operation with minimal operator intervention.
FleXinspect is a new tool that increases efficiency and reduces costs by allowing glassmakers to configure only those functions they need on a modular platform. To reduce capital expenditures while maintaining flexibility, the manufacturer can add additional inspections on the existing platform as the need arises. With a large 19” touchscreen, the user interface has been enhanced to utilize icon-based command sequences for simplified set up and operation. Container inspection parameters can be pre-programmed for easy recall, thereby reducing downtime for job changes. Additional highlights include built-in production trending screens, change logs recording all settings being modified, and system logs monitoring the machine uptime.

Inline container inspection machines

FleXinspect Total Mechanical Vision Vision Vision
Inspections: FleXinspect T FleXinspect M FleXinspect BC FleXinspect B FleXinspect C
Base ........................................ X X
Base stress ...................................... ● ● ● ● ●
Sealing surface .................................. ● ● ● X X
Mold number reading
- Heel dot codes .............................. X X ● ●
- Bottom codes ................................. ● ● ● ● ●
Vision plug ...................................... X ● ● ● ●
Vision dip/saddle ................................ X ● ● ● ●
Vision ring ...................................... X ● ● ● ●
Wine edge ........................................ ● ● ● ● ●
Check detection ............................... X X
Wall thickness 1-4 head ...................... ● ●
Mechanical plug, dip, saddle, ring ........ X
Out of round detection 2 pts ...............● ●
Side wall inspection (opaque) ............. ● ● X
- Dedicated transparent ..................... ● ● ●
- Dedicated shoulder ...................... ● ● ● ● ●
Side wall stress ................................ ● ● ● ● ●
- Dedicated shoulder stress .............. ● ● ● ● ●
Dimensional inspection (lean, height, diameter) ............................................... ● ● X X

X standard inspection
● additional inspection

* The sidewall inspection on the FleXinspect T is performed in two stations and is optimized to detect all types of glass defects in all areas of the container from the heel to the top of the neck
** The sidewall stress inspection on the FleXinspect T is performed in two stations and is optimized to detect stress types in all areas of the container from the heel to the top of the neck
FleXinspect T

A reliable and uniquely configurable platform that easily allows additional inspection functionality and redundancy as needed. The FleXinspect T provides unmatched modular versatility, value, and flexibility for glassmakers’ current and future requirements.

As a component of the FleXinspect family, the FleXinspect T can be used in concert with the FleXinspect BC to create the most comprehensive inspection solution in today’s market.

A total inspection solution  The FleXinspect T gives glass manufacturers a total inspection solution, as the fully equipped system is capable of providing all the necessary cold end inspections. The unique design of the servo-driven handling devices allows inspections that in the past were not possible with rotary inspection machines.

- Reduced line space and maintenance
- Higher speeds and larger ware
- Precise container rotation
- Non contact vision gauging (plug, ring, dip)

Reduced line space and maintenance
- Multi function configurations reduce the total number of machines per inspection leg
- High speed machinery reduces the number of inspection legs per forming line
- Significant maintenance and labor savings due to fewer inspection machines in the production area

Higher speeds and larger ware
- New starwheel design allows for higher speeds on large diameter containers
- Flexible starwheel pocket configurations to maximize throughput (BPM)
- Synchronized servo technologies to optimize overall machine efficiency

Precise container rotation
- Servo driven rotator with modular design for improved operation
- Servo technologies providing rotation performance feedback
- Modular design allows for maximum setup flexibility

Non-contact vision gauging (plug, ring, dip)
- Elimination of possible contamination or damage to the finish
- High speed operation with improved accuracy
- Simple and quick setup

Standard inspections
- Vision plug
- Vision ring
- Vision dip/saddle
- Check inspection with modulated lights and sensors
- Heel dot code mold number for defect correlation

Additional inspections
- Mechanical plug/ring
- Mechanical dip/saddle
- Base
- Base stress
- Sidewall opaque
- Sidewall stress
- Sealing surface
- Bottom mold code reader (alpha dots)
- Vision wire edge detection
- Wall thickness measurement (chromatic light)
- Non-contact 2 point out of round (ovality)
- Dimensional (lean, height, diameters)
FleXinspect M

As a reliable machine platform the FleXinspect M allows configurable inspection functionality. It provides modular versatility, value, and flexibility for glassmakers’ current and future requirements.

Part of the FleXinspect machine family, the FleXinspect M can be used with the other FleXinspect products to create the most comprehensive inspection solution in today’s market.

Combined inspection
The FleXinspect M gives glass manufacturers the potential to reduce the cold end footprint by combining multiple inspections within a single machine frame. The unique design of the servo-driven handling devices allows accurate reliable inspections not historically associated with rotary inspection machines.

- Inspection flexibility
- Modular and configurable to meet all of your current and future inspection needs
- Round and non-round inspection
- Speeds to 300 bpm

New infeed design
- Precise container control and smoother starwheel loading with 30° entry angle
- Unique design allows users to reposition the screw if needed to have a built-in bypass
- ‘Reach over’ design allows the machine to be installed on any straight section of conveyor with minimal effort

Modulated LED check inspection
- Reduces good ware loss caused by ambient or reflected light
- Long life LED emitters with ‘auto checking’ for damaged or unplugged hardware
- Allows greater area of inspection coverage with fewer emitters

Non-contact wall thickness inspection
- Accurate repeatable results with minimal required maintenance
- Provides more information for better control (thin, thick, ovality)
- Greater flexibility of measurement locations (corners, tapers, embossings)

Standard inspections
- Mechanical plug
- Mechanical ring
- Mechanical dip/saddle/height
- Check inspection with modulated lights and sensors
- Heel dot code mold reader for defect correlation

Additional inspections
- Base
- Base stress
- High resolution finish (sealing surface)
- Bottom code vision mold reader for defect correlation
- Wall thickness measurement (4 elevations)
FleXinspect BC, B, C

FleXinspect machines can be supplied as independent stand alone units FleXinspect B and FleXinspect C, or joined together as a combined machine FleXinspect BC.

FleXinspect is a reliable and uniquely configurable platform that easily allows additional inspection functionality and redundancy as required. The FleXinspect family provides unmatched modular versatility, value, and flexibility for glassmakers’ current and future requirements.

Unmatched inspection accuracy
- High resolution camera technology for improved defect detection (1.4 megapixel)
- Programmable long life LED illumination providing repeated, accurate results
- Stable, precise and efficient ware handling

Maximum throughput at minimum speed
- Ware volume sensors monitor bottle input (BPM) and automatically adjust conveyor speed for maximum throughput
- Integrated container spacing device delivers optimal spacing
- Minimum spacing allows for reduced linear conveying speeds

Optimized container stability at high speed
- Improved container stability for round, non-round and tapered ware due to individually adjustable servo belt handlers
- Integrated container separator releases container at conveyor speed
- Precise conveyors for smooth transfer through the inspection areas of the machine

Comprehensive vision inspection
The proprietary design of the FleXinspect BC includes 360-degree wraparound lighting and patterned lighting for 100% sidewall inspection of containers to precisely pinpoint both opaque and transparent defects. Polarized lighting is utilized for stress inspection to ensure detection of defects that may be missed by conventional methods. When equipped with a mold reading option, the FleX BC mold correlates results from all installed inspections.
Statistical sampling machines

Bucher Emhart Glass statistical sampling machines are designed to provide frequent measurement of a variety of critical glass container dimensions through sampling, giving the glassmaker valuable feedback about the quality of the production and advance warning of any drift in the forming process.

These machines provide valuable product quality information where the bottlemaker can take immediate action, thus significantly reducing the response time to possible anomalies. Furthermore, by reducing the feedback time to the hot end operator they are very effective tools in bringing the forming process to target pack-to-melt and shortening the actual job change time.

These statistical sampling solutions ensure adherence to critical quality criteria and reduce plant labor via automation while improving measurement accuracy and repeatability.

Bucher Emhart Glass machines for statistical sampling are designed to provide frequent measurement of a variety of critical glass container dimensions through sampling, giving the glassmaker valuable feedback about the quality of the production and advance warning of any drift in the forming process.
MiniLab

MiniLab is a complete turnkey solution for statistical sampling of glass containers that not only ensures adherence to critical quality criteria but also reduces plant labor via automation while improving measurements’ accuracy and repeatability.

MiniLab is designed to provide frequent measurement of a variety of critical glass container dimensions through sampling, giving the glassmaker valuable feedback about the quality of the production and advance warning of any drift in the forming process. Its flexible and scalable design lets glass manufacturers integrate multiple devices to serve specific quality control requirements.

Benefits

- Fast and accurate measurement of a variety of critical glass container dimensions
- Also measures wall thickness, capacity and burst pressure
- Increases the frequency and efficiency of the time-consuming quality control tests
- Designed to withstand operation on the production floor
- Connects to a factory information system, closing the loop to a plant-wide process improvement system

A typical MiniLab includes conveyors, gates, and control system as well as a combination of one or more of the following devices:

- Mold Code Reader
- ISIS Dimensional Gauging and Weight Measurement System
- MLP Pressure Tester and Capacity Measurement System

MiniLab is available in several configurations that are easily installed in your lab or on the production floor:

- Off-line sampling with sets of containers loaded manually by the operator
- Automatic sampling with containers automatically diverted from the production line(s)

MiniLab conveniently interfaces with your factory information system for data gathering, archive, and further analysis with SPC tools to review historical data and production trends.

MiniLab components

ISIS Dimensional Gauging and Weight Measurement System

ISIS brings state-of-the-art vision technology and accurate servo-controlled handling to precision measurement of glass containers. Using high-resolution cameras and application specific optics, ISIS is designed to measure the dimensional characteristics of glass containers.

ISIS can measure containers of different sizes without requiring a job change.

ISIS is built to withstand tough production environments and provide years of reliable service.

ISIS Wall Thickness Gauge

The Wall Thickness Gauge uses a single non-contact chromatic sensor to measure the wall thickness of glass containers. A servo-controlled linear slide automatically keeps the chromatic sensor at optimal distance from the surface of round and non-round containers during the entire measurement sequence.

Once installed and calibrated, the Wall Thickness Gauge does not require any mechanical adjustment. When creating a job, the operator simply specifies the distance from the top or base of the container the different wall thickness measurements should be performed. Up to nine locations can be specified, each with different diameter and min/max limit values.

MLP Pressure Tester and Capacity Measurement System

MLP measures the maximum amount of internal pressure a container can withstand (meets the ASTM C-147 standard for internal pressure testing of glass containers). In addition, MLP can be equipped with the Capacity Gauge. When equipped with this option MLP can accurately measure the capacity of a container at several fill heights. The system automatically compensates for variation in water temperature and flow rate.

MLP can test two containers of different sizes (with same finish size) without requiring a job change. Job change parts are minimal and a complete changeover does not require any mechanical adjustment.

Constructed with a stainless steel frame, MLP is built to withstand tough production environments and provide years of reliable service.

Mold Code Reader

The Mold Code Reader is specifically designed to operate with a MiniLab in an Off-Line configuration. It automatically reads the mold number of origin of containers thus saving the operator from entering this information manually. A sensor associated with a slow stop/rotate mechanism reads all commonly-used heel dot codes from round glass containers.

MiniLab Data Collector

The MiniLab Data Collector is designed for use in factories that are not equipped with a factory information system. It collects all measurements from the MiniLab in a database for archive and further analysis. MiniLab Data Collector has SPC tools and custom analysis software to review historical data and production trends.
Projects

When you choose Bucher Emhart Glass, you’re buying much more than just a machine.

As a global partner to the glass container industry, we support customers around the world with a full range of project services, from installation and commissioning through to refurbishment and training.

Whatever you want to change or improve at your glass plant, we’ll make sure your project is specified accurately, managed effectively, and completed on time and to budget.
Range of projects

We can help with projects of every size and type, from rebuilding or modernizing a single forming or inspection line right through to completely new production facilities.

We can also offer expert advice and hands-on support to improve the speed, efficiency, quality, or safety of your existing production line.

Global sales support and project management

No matter how big or small the project you have in mind, our teams of sales and project managers consult you competently. We can offer a wide range of production assistance options to optimize your current production, to produce a new type of bottle or to change to a new forming process.

As the world’s leader in equipment, services, and technology solutions, Bucher Emhart Glass has the combined strength of our organization and the resources of our global network of global Bucher Emhart Glass experts and specialized external partners available to ensure the success of every project.
**Project management**

We manage and monitor the work of everyone involved in the project, including third parties on both sides. We handle all the technical work required, including removing old equipment, shipping and installing new equipment, and integration with the physical/functional environment at your facility.

**Project definition and planning**

Working from your requirements, we define the overall technical scope of the project and the contribution we will make, including timelines/milestones, organization, and financials. We identify key parties (including subcontractors), assign work packages, and set up managerial and contractual structures.

**Customization**

We can configure our machines or engineer custom parts to meet your specific requirements. Any special requirements can be integrated into a broader installation or refurbishment project as required.

**Machine acceptance**

Once your machine is completely assembled and tested, our project manager together with your experts visit our assembly plant to inspect the finished machine. Specific acceptance criteria can be checked depending on your requirements. It is also a good point in time to discuss details of the machine installation at your site. Many of our customers take the opportunity to combine the machine acceptance with a training session in one of our training centers.

**Installation and commissioning**

We offer a range of options to suit your individual needs and skills base. With a full installation, our team carries out all the mechanical and electrical work necessary. Alternatively, we can supervise an installation carried out by your own staff. Finally, we carry out any ‘cold run’ tests required.

We have over 50 skilled service engineers based all around the world, supported by contractors and coordinated from our HQ in Switzerland. With 22 different nationalities in the team, we can often provide staff who are based near your location and speak your language.

**Startup assistance**

Once your project is completely installed, our experienced service engineers and production specialists can assist you to successfully start up your new production line. We can carry out ‘hot run’ tests or performance tests if required. Once your production line is running, we support you with our 24/7 emergency assistance and our comprehensive parts and services portfolio.

Our sales and project manager teams continue to be your personal contacts.
After sales

With a team of around 100 specialized staff based at 14 locations around the world, our after sales business team works alongside our sales team to address technical issues and build stronger partnerships with our customers. The division is made up of:

- Parts
- Services
- Training
For glass plants, good maintenance is not just about controlling costs. It is also an essential factor in sustaining high performance and minimizing downtime across the entire plant.

Parts and services

Bucher Emhart Glass supports customers with the most comprehensive portfolio of production and inspection accessories, spares and wear parts available anywhere in the glass industry, as well as a full range of refractory parts and consumables.

We support the daily repair and maintenance business in our customers’ glass plants with our high quality parts which are also available as specially designed maintenance and repair kits that simplify everything from purchasing to hands-on repairs. Bucher Emhart Glass offers repair services for a wide range of components and supports customers with the selection and definition of repairs.

Dedicated, highly skilled engineers offer support with everything from installation and commissioning through 24 hour emergency assistance and remote service. Drawing on their broad experience, our highly qualified production specialists can help you identify and solve issues with performance or quality. We can also carry out on-site machine and performance audits leading to tailored improvement programs that are focused on equipment updates and/or training.
Customer Contact Parts CCP and Web Shop

The cooperation between Bucher Emhart Glass and our customers depends greatly on efficient communications. In each sales location, the Customer Contact Parts department is the first contact for the daily parts-related business. Offering contact in the local time zone and in the local languages is an important service to support our customers in their 24 h, 7 day operations.

Our Web Shop is a second channel for ordering parts, as well as for tracking the order status. It provides various search functions in our comprehensive parts portfolio, for example, search by item number, product category and specific products such as ‘555 feeder’. A powerful new feature is the ability to search by attributes describing the parts in detail, for example, ‘funnel arm – 5”DG – quick change – offset alignment – 3½ funnel diameter’.

24/7 Emergency service

For production critical emergencies our 24/7 Emergency assistance offers you phone assistance around the clock by experienced service engineers. If necessary, we can dispatch a service engineer for urgent on-site service.

FlexIS Remote Service

Within a short time, FlexIS Remote Service has established itself as an important pillar of our services portfolio. FlexIS Remote Service gives you ready access via secure internet to highly technically experienced FlexIS experts in operation, troubleshooting and maintenance. Lower operation costs, less downtime and production losses are the major benefits. More remote services are in the pipeline.

Field services

Our more than 50 skilled global service engineers can resolve any issue you may have with your forming or inspection equipment. With 22 different nationalities in the team, we can often provide engineers who are based near your location and speak your language. When our service engineers are on-site they are supported by additional service experts by phone and/or remote assistance.

Maintenance and repair kits

If you want to refurbish your equipment in-house, we offer a range of maintenance and repair kits tailored to virtually all our current and legacy machines. Each kit contains all the parts you need to restore your machine to full working order, based on two levels of refurbishment:

- Maintenance kits are for checking and cleaning a mechanism after a moderate period of use
- Repair kits are for a complete refurbishment after several years of service

Maintenance and repair kits are ideal for everyone involved: workshop personnel, inventory and purchasing. Not only do they reduce the cost of maintenance, but they also ensure that every required part is available and easy to find in a single box. You also save time by ordering your kit with just one item number, instead of spending valuable time working through drawings and identifying individual items one by one.

Repair, upgrade, refurbish services

The highly aggressive conditions of a glass plant inevitably lead to wear on even the best-designed mechanical and electronic components. In some cases this damage can optimally be fixed by replacing the item with the latest version from the original supplier. In other cases, it makes economic and operating sense to overhaul the assembly, and restore it to as-new condition. Bucher Emhart Glass offers a repair service for a wide selection of equipment, ranging from entire gob distributors to components of the control system, to cold end inspection systems.

Bucher Emhart Glass offers two distinctive approaches for repairs. For on-site repairs, an experienced crew performs the agreed repair in the customer’s plant. As the equipment does not have to leave its position, the de-installing and re-installing of the equipment is not required and the shortest possible downtime is achieved. In cases where the equipment must change its position and/or in cases the repair is combined with a major upgrade, Bucher Emhart Glass offers the repair/upgrading to take place in the workshop of one of our repair partners, preferably at Ergon Meccanica in Dego, Italy.
Parts portfolio

Our parts portfolio comprises around 150,000 parts for refractories, hot end equipment and inspection machines. We support the full range of Bucher Emhart Glass products, including legacy equipment – covering almost 100 years of our history as glassmaking innovators. Since the interfaces we originally designed are widely adopted in the industry, many parts are interchangeable. Hot end parts are made at our large in-house machining facility in Örebro. We work to the highest standards, with strict quality control. The precise workmanship, tight tolerances and high quality materials in our parts guarantee optimum performance.

S-Class program

Bucher Emhart Glass maintains the world’s largest stock of parts and accessories for container glass machines, refractories and inspection equipment. Under our S-Class program, 5,000 of the most often requested/important parts for hot end and inspection machines are always available directly from inventory, ready to be shipped within hours of ordering. Refractory S-Class parts can be finished to your configuration and shipped within eight working days. Rapid delivery is ensured by our partners’ global logistic network. S-Class lets you reduce inventory to a minimum, releasing capital. And you can rest assured that every item will always be the latest version, in perfect condition, with the normal warranty.

To maximize uptime, it is essential to have the right parts at the right time. Our S-Class program offers reliable delivery times to help customers optimize their inventory. We can support customers’ efforts towards lean inventory management with consumption analyses and improvement proposals. Our online guides help customers to quickly find the right parts for every job. Of course, quality parts only benefit you once you receive them. And with logistic centers at Luxembourg, Elmira and Owensville, we offer almost every part you’ll ever need from a ‘one stop shop’ ready for rapid dispatch to your door.

Inventory management

The cost of holding stocks of spare parts and accessories at the plant level is a significant but often underestimated element in the lifetime costs of an IS machine. Given the enormous range of parts needed, inevitably stock at the plant, however extensive, will contain the wrong items. The consequences are often expensive downtime that could have been avoided and a store full of infrequently-used parts of deteriorating value. Fortunately, there is a better way. Bucher Emhart Glass maintains such an extensive stock of parts, and can supply them so quickly, that plants can rely on this central stock for most requirements. This is particularly true for S-Class parts whose delivery time can be guaranteed. We can analyze the stock holding of a plant and indicate where savings can be made without any cost or commitment to the customer. You may be astonished at the potential savings waiting to be uncovered.

Technical expertise

The IS machine has such a long history, covering many generations and variations of equipment, that technical questions about components may be difficult to answer confidently, unless you have access to experts in this field. We have the experts, and you can access their combined decades of practical and theoretical knowledge to deal with such topics as component compatibility, obsolescence and replacement and machine upgrading and repairs. Contact your Bucher Emhart Glass representative for more details.

Production assistance

Our team of forming specialists offers a wide range of production assistance options to optimize your current production, to produce a new type of bottle or to change to a new forming process.

- Eliminating critical defects
- Increasing cavity rate
- Reducing container weight
- Increasing pack to melt
- Improving quality level
- Developing new jobs
- Mastering demanding container features
- Training operators and increasing in-plant knowledge
- Reviewing standard operating procedures SOP
- Maintaining mold equipment
- Increasing process stability

Audit

Mechanical, electrical and production audits ensure that subsequent upgrades, repairs, conversions or new production processes can be planned and implemented smoothly. Audits are recommended for preparation of large repairs and upgrades and to enable production support, at times resulting in a TAA.

Technical Assistance Agreement TAA

A Technical Assistance Agreement TAA helps you to enhance your operation quickly and sustainably in terms of production speeds, efficiency and elimination of critical defects. A TAA is led by an appointed highly qualified Bucher Emhart Glass forming specialist familiar with the specific situation of your plant operation. TAAs are a combination of various services such as training, production assistance, and remote support.
Our fully qualified training team helps customers worldwide (and our own staff) get the very best out of Bucher Emhart Glass equipment. Hands-on instruction is available in several locations around the globe, with classroom training available at many Bucher Emhart Glass offices. We can also provide on-site training at your own factory. Most customers buying new machines opt for training at one of our own sites, usually during pre-shipment acceptance testing. Training can be fully tailored to your requirements, whether you need to bring personnel up to speed on the latest developments or help industry newcomers get to grips with the basics.

Bucher Emhart Glass inspection competency centers

In order to accomplish the challenging task of providing regional support as a global company, Bucher Emhart Glass has located three competency centers around the world. They are strategically located in the Americas, Europe and Asia/Pacific. The goal is to provide our customers with support beyond the machine. It’s imperative that the strategy is in place to support our customers in each of their respective markets. Each center consists of open-plan facilities containing the latest state-of-the-art inspection equipment, classrooms, service/technician workspace, laboratory facilities and a complete demonstration area. These facilities can be used to demonstrate our equipment to customers, conduct hands-on training and container testing. Training can be conducted in more than 10 languages either in the competency centers or at the customer’s site. In addition, the competency centers serve as a hub for local project managers, field service engineers and other regional support functions. This benefits both Bucher Emhart and their customers allowing interactive continuity on a regional level while maintaining global leadership in the market. Customers do not have to send their employees across the world – they have a choice to select from the closest or preferred competency center located in Cham, Switzerland, Johor Bahru, Malaysia or Windsor, CT USA.

Container forming equipment training

Training on hot end equipment is delivered at our Training Centers in Sundsvall, Sweden and Johor Bahru, Malaysia. Programs cover the entire hot end product portfolio, plus mold design and VertiFlow cooling configurations. Our service engineers also act as trainers, allowing us to offer training in twelve languages: English, French, German, Italian, Spanish, Portuguese, Dutch, Swedish, Japanese, Chinese, Polish and Russian. In 2008, we completely rebuilt the Sundsvall training center. Designed by architect Ewa Kardel, the new facility provides a wonderfully light and calm environment for learning. It features two classrooms, each equipped with the latest audio equipment, plus a hands-on area with all current Bucher Emhart Glass machines installed. EF, AIS and NIS sections allow students to carry out section setups, dry runs and job changing, or make control adjustments and see the results immediately.
About us

Bucher Emhart Glass is a company with a rich heritage and a tradition of excellence that we are proud to continue today. Our founders laid the foundations for automation in glass manufacturing, setting us on a course of market-leading innovations that has lasted for almost a century. We created the industry-standard IS machine and have repeatedly delivered game-changing innovations in gob forming, container forming, automation, control and inspection.

Growing strategically through new branches, alliances and acquisitions, we have developed into a true global enterprise with the power to serve customers around the world with speed, responsiveness and understanding. Our global footprint provides the very best in established expertise, economical manufacturing and hands-on client support.

Our work is underpinned by a profound and unshakeable belief in glass as a packaging material. And we back up that belief with investment in R&D. Driven by our clients’ priorities, we continue to work towards new milestones in production speed, product quality, testing precision and glass container strength. The ideas we have today will deliver the improvements of tomorrow.
When you choose Bucher Emhart Glass, you are choosing a partner with a century of proven stability and professionalism, even on the largest projects. At every step of the journey, you will feel the reassurance of dealing with a true market leader with over 100 years of experience. We believe in glass. We are totally committed to it, regarding it as the foundation of our future and that of our clients. Glass is a premium product in a growing market, with strong credentials in every area: it is 100% recyclable, protects products, builds brands and appeals to consumers.

With stability into the future

We have a century of growth and innovation behind us. Our founders created the first glass gob shearing devices and plunger feeders, laying the foundations for the automation of the glass container industry. Throughout our development, we have sought out opportunities to bring new members into our group. In 1982, we acquired Powers Manufacturing Inc., the US-based specialist in high quality cold end inspection equipment. The Powers facility was ideally suited for producing our Total Inspection Machines TIM. In 2007, we brought a new depth to our cold end expertise with the acquisition of ICS Inex Inspection Systems. Established in 1855 as the Barry-Wehmiller Machine Co. supplying early production line innovations, the company created Optitron, the first inspection machine for refillable bottles, in 1955. The following decades saw Inex establish a strong position in glass container inspection devices for the pharmaceutical, food and general packaging industries. Today, we offer a comprehensive range of inspection systems, high precision on-line sampling systems and label inspection devices.

Since 1998, being part of the Bucher Industries Group has brought us even greater financial and organizational strength. Based in Switzerland, Bucher is a diverse industrial group with interests in related areas of mechanical and vehicle engineering including agriculture, street sweeping, beverage production and hydraulics. In 2011, we struck a landmark joint venture with Shandong Sanjin Glass Machinery Co., China’s undisputed market leader for container glass machinery and equipment. This collaboration offers a perfect fit in terms of product portfolio and represents the ideal way for both companies to meet local demand for efficient, accurate glass production.

Today, Bucher Emhart Glass is established as the world’s leading international supplier of glass container manufacturing solutions, including equipment, controls, parts, and support. We continue to work towards innovations that will deliver genuine gains in productivity and efficiency for our clients.

As well as supporting our customers, we support our own people. To help our employees develop in a positive way, we aim to generate a positive working environment where people feel part of a team. Strong internal knowledge support groups help staff members leverage expertise across international and departmental boundaries. Suppliers, too, are treated as partners in adding value: we trust them to deliver on time and we pay on time when they do. Our strong reputation and low staff turnover are testament to the value of our culture.
Our progress

Bucher Emhart Glass began 100 years ago with the quest to improve gob forming technology. A century later, we have become a multinational industry leader serving the glass industry around the world. This is our story.


1912 Four more businessmen join to form the Hartford-Fairmont Company, which develops the first glass gob shearing and feeding device, the forerunner of modern glass container machines.

1913 Hartford-Fairmont introduces the first plunger feeder, laying the foundations for the automation of the glass container industry.

1922 Hartford-Fairmont joins with the Empire Machine Company to form Hartford-Empire.

1924 Glass-making pioneer Henry W. Ingle creates the first Individual Section - IS machine, a new automation standard that still forms the core of our product range.

1925 The first four IS machines go into operation, heralding the dawn of automatic container manufacturing.

1932 Hartford-Empire introduces a continuously rotating paste-mold machine, allowing glassmakers to manufacture seamless tabeware.

1940 The first double-gob equipment is introduced.

1945 The HE-74 check inspector is introduced, and inspection research is made a priority.

1951 A new name, Emhart Manufacturing Company, reflects an ambition to explore new directions.


1954 The first six-section IS machine is introduced, along with the HE-127 automatic finish check inspector.

1968 The first triple-gob machine is introduced.

1970 The first eight-section double-gob machine hits the market, delivering a 30% improvement in productivity.

1972 A ten-section double-gob machine with modular sections is introduced.

1974 Emhart Glass ships its 1000th IS machine and launches its innovative 516 electronic control system.

1977 The first Advanced IS machine - AIS is installed.

1980 Emhart Glass’ first total machine AIDA (Automatic Inspection Defect Analysis).

1982 Emhart Glass acquires Powers Manufacturing Inc. based in Elmira, NY. Powers had established an international reputation for quality cold end inspection equipment, and its facility was ideally suited for producing Emhart Glass’ Total Inspection Machines TIM.

1985 The VertiFlow mold cooling system is introduced, almost doubling production speed and enhancing product quality and strength.

1986 Emhart Glass introduces its FlexLine system, allowing glass producers to make rapid changes to the number of IS sections being used.

1989 Emhart Glass is acquired by the Black & Decker Corporation.

1990 Emhart Glass launches innovations including servo-electric parallel shears, an improved 555 servo-electric feeder system, the T600 LAN forming control system, the 560 servo-electric pusher and pocket air fingers for pusher mechanisms.

1998 Emhart Glass is acquired by Bucher Industries of Niedenweningen, Switzerland.

1998 Bucher Emhart Glass completes the acquisition of ICS Inex Inspection Systems. Established in 1855, Inex created Optitron, the first inspection machine for refillable bottles in 1955, and subsequently built a strong position in inspection devices for the pharmaceutical, food and general packaging industries.

2000 The next generation IS machine NIS is introduced, delivering up to 4.2% higher cycle rates, reducing workout times by half and increasing mold life by up to 20%.

2005 NIS becomes available in a quad-gob configuration.

2007 Bucher Emhart Glass completes the acquisition of IG Inex Inspection Systems. Established in 1855, Inex created Optitron, the first inspection machine for refillable bottles in 1955, and subsequently built a strong position in inspection devices for the pharmaceutical, food and general packaging industries.

2008 Bucher Emhart Glass opens a completely new, state-of-the-art production centre at Johor Bahru, Malaysia. The factory is devoted to the assembly of new IS machines, cross conveyors, and the fabrication of welded parts, with facilities for warehousing, training, and demonstrations.

2010 FlexInspect, a comprehensive and modular inspection technology, is launched.

2011 Bucher Emhart Glass finalizes a joint venture with Shandong Sanjin Glass Machinery Co. of China. Together, the companies have a comprehensive product portfolio and are ideally placed to serve the fast-developing glass industry in China.

2012 BIS, a highly flexible new configuration of the industry-standard IS technology, is introduced.

2012 First hard glass line is installed. ProLab, a hot end measurement system and HexKadar are announced.

2013 Emhart Glass becomes Bucher Emhart Glass to emphasize our connection with the Bucher Group, an industrial leader with a clear vision for the future.
Research and development

From our beginnings more than 100 years ago as the inventors of IS glass forming technology, our success has been based on innovation. Today, we continue to search out new ideas that will shape both our future and that of the entire glass industry.

We aim for innovations that will help our customers thrive in today’s commercial and economic environment. That means helping them improve operator safety, automation, process control, productivity, and flexibility. As partners to an industry where environmental concerns are paramount, we also focus on areas such as energy economy, lower cost of ownership and reducing container weight to save material, transport and energy.

Container forming. Our forming R&D team spans six locations across three continents, from Sweden, Italy, and Switzerland to the USA and Malaysia. Our engineers focus on three key areas: automation, productivity, and flexibility.

In automation, our aim is to make the glass-forming process more stable and repeatable, and less dependent on the skills of expert operators. Results of our efforts include closed-loop controls for plunger-up motion and blank cooling, which use machine readings to optimize production automatically in real time, and the FlexKadar hot end inspection system.

Productivity is about making the manufacturing process faster and more efficient, to unlock improvements and savings for glass plants. Finally, innovations in flexibility help producers switch between different containers more quickly, or produce different types of container at the same time. The recently introduced BIS machine (page 14) is a prime example of a flexible machine ideally suited to today’s market.

Inspection. No other firm offers the same depth of inspection experience combined with a proven commitment to product development. Our inspection research facility in St Petersburg, FL (USA) houses a dedicated team of engineers specializing in mechanical design, software development, optics, and application engineering for glass-container inspection. Current priorities include expanding the capability of our modular FleXinspect technology, radically simplifying user interfaces, and closed-loop control.

Research center. At our research center in Windsor, CT (USA), a team of over 50 people from all over the world works to improve our existing products and develop new ones.

The state-of-the-art facility includes a complete production line for forming and inspecting glass containers, allowing engineers to test new ideas in real-world conditions, gather incredibly detailed production data, and develop valuable time-saving solutions such as our software for automatic multi-gob weight setup.

Customers can also visit the research center for help with specific issues around quality, efficiency, speed, flexibility, safety, or energy savings.
Emhart Glass Worldwide Presence
Principal
Emhart Glass SA
Hinterbergstrasse 22
CH-6330 Cham, Switzerland
Tel. +41 41 749 42 00   Fax +41 41 749 42 71
webmaster@bucheremhartglass.com
www.bucheremhartglass.com

Neuss Germany
Emhart Glass GmbH
Hammerfeldstrasse 48 • DE-41460 Neuss Germany
Tel. +49 2131 3595 0   Fax +49 2131 3595 125

Savona Italy
Emhart Glass S.r.l.
Largo delle Caffee 1/1 • 17100 Savona Italy
Tel. +39 019 51 66 1   Fax +39 019 51 66 301

Kawasaki Japan
Emhart Glass Japan Pte Ltd
Parale Mitsui Bldg. 15F • B Higashicho • Kawasaki-ku
Kawasaki 210-0005 Japan
Tel. +81 44 222 7371   Fax +81 44 222 4868

Johor Bahru Malaysia
Emhart Glass Sdn Bhd
No.15 Jalan Mahir 2 • Taman Perindustrian Cemerlang
81800 Ulu Tiram Johor Malaysia
Tel. +6 07 863 1122   Fax +6 07 863 7717

Singapore
Emhart Glass Pte Ltd
200 Pandan Loop • 07-03 Panotech 21 • Singapore 128388
Tel. +65 6778 1466   Fax +65 6778 9433

Örebro Sweden
Emhart Glass Sweden AB
Skërbäcksvägen 44 • PO Box 6063 • SE-700 06 Örebro Sweden
Tel. +46 19 307 500   Fax +46 19 307 501

Sundsvall Sweden
Emhart Glass Sweden AB
Universitetsvägen 3 • PO Box 718
SE-851 21 Sundsvall Sweden
Tel. +46 60 199 100   Fax +46 60 199 261

St. Petersburg FL USA
Emhart Glass Inc.
9875 18th Street North • St. Petersburg FL 33716 USA
Tel. +1 727 471 1113   Fax +1 727 471 1290

Elmira NY USA
Emhart Glass Manufacturing Inc.
1240 Sullivan Street • Elmira NY 14901-1695 USA
Tel. +1 607 734 3671   Fax +1 607 734 1245

Windsor CT USA
Emhart Glass Inc.
123 Great Pond Drive • Windsor CT 06095 USA
Tel. +1 860 298 7340   Fax +1 860 298 7395

Owensville MO USA
Emhart Glass Manufacturing Inc.
405 East Peach Avenue • PO Box 580
Owensville MO 65066 USA
Tel. +1 573 437 2132   Fax +1 573 437 3146

Perrysburg OH USA
Emhart Glass Manufacturing Inc.
1899 N Wilkinson Way • Perrysburg OH 43551 USA
Tel. +1 567 336 7733   Fax +1 567 336 8727