Partnering for Perfect Packaging Solutions
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Welcome to our new brochure

This year is a very special one for Emhart Glass: we are celebrating our centenary. Our company has been developing and marketing solutions for the glass container industry since Hartford-Fairmont was founded in 1912.

It all began with Karl E. Peiler’s revolutionary design for the paddle-gob feeder, and soon progressed to the IS machine, which is still the industry standard. Along the way, the firm diversified into inspection, expanded globally and continually improved IS technology, making it indispensable to generations of glassmakers.

Our impressive history is an obligation to develop and offer technologies, products, solutions and services which support the glass industry now and in the future. This brochure presents the entire Emhart Glass range, from technologies for gob and container forming through to ware handling, cooling, and inspection.

The IS family welcomes a new member: BIS. It is a highly flexible machine that can produce a huge range of different wares and weights with very quick job changes. If you have a single line making different products, in different volumes, BIS is the machine you have been waiting for.

We continue to develop and improve our parts business with S-Class, our express parts delivery program, and our easy-to-use maintenance and repair kits. We also offer unrivalled technical services, including training, process and production support and project management.

If there is one lesson to be learnt from our history, it is that everything begins with the customer. From the quest to improve forming technology in the 1920s to the introduction of BIS, everything we have done has been the answer to a customer’s question. Your priorities and expectations today will shape the solutions we provide tomorrow.

With all best wishes for your future success.

Martin Jetter
President
The Sustainable Quality challenge

With today’s increased demand for innovation in equipment and services there is constant need to focus on increasing quality. In Emhart Glass, systems and technologies are moving in directions that have never been seen before within the glass industry, and the reliability of these products is a pre-requisite for success. We are aware that quality is not only limited to our products but it relates to everything we do. It may be said that “quality is the perception of an individual that is effected by a historical experience (positive or negative)”, which is correct. But this perception of quality has a reason. It did not just happen by chance.
During 2010 important steps have been taken to enhance the quality structure and systems within our company. Our customers’ feedback has been collected and fully analyzed. This data enabled us to make better decisions today and will also help us in the future. We are fully aware that the initiative to strengthen the quality organisation and its systems within Emhart Glass is driven by the value of its importance to our customers. Their profitability is our concern. Poor quality can simply be described as the reason why any company “sinks or swims”.

In today’s world with high demands, the challenge is to ensure that sustainable quality is at the forefront of all of our new innovations and business practices. It is also vital that we support customers with high quality service, no matter what generation of Emhart equipment they are using.

Now to the main fact!

The voice of our customers is key to everything we do, this being independent of customer location, size or technology installed. The mission of the new quality organization is to continuously listen to these voices, so that we can act appropriately. Our direction is set: To achieve the highest customer satisfaction rating possible. Our customers are the reason why we take this direction with an open mind and a constantly listening ear, and everything we do will have their demands at the heart and soul of who we are.
The heart and soul of Emhart Glass

Our vision is a world with glass as a dominant and preferred ecological material, enabled by 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 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, 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 resource 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.
Container Forming

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 flexible, productive, and energy efficient machine available today. A fully servo machine that is easily converted between double, triple and quadruple gob offering the most flexible high productivity unit possible.

**AIS Machines**: The proven class leader in pneumatically driven machines, with the famous parallel mold open and close mechanism.

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

**BIS Machines**: The latest servo BIS machine is focusing on small and mid size container production, providing highest flexibility and performance, enabling fast job changes, process and center distance changes thus combining the best of NIS and AIS.
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 pre-requisite 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 heavy investment in automation and controls, 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 of container, at the lowest cost.
## Machine Overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Gobs</th>
<th>Center</th>
<th>Market entry</th>
<th>Sections</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>NIS</td>
<td>NIS</td>
<td>QG</td>
<td>95 mm</td>
<td>2005</td>
<td>6 8 10 12 16</td>
<td>full servo electric with parallel mold open and close mechanism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TG</td>
<td>5”</td>
<td>2000</td>
<td>– ✓ ✓ ✓ ●</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DG</td>
<td>6¼</td>
<td>2000</td>
<td>– ✓ ✓ ✓ ●</td>
<td></td>
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</tbody>
</table>

| AIS    | 6¼    | TG   | 4¼     | 1976         | – ✓ ✓ ✓ ✓   | pneumatic with servo options and parallel mold open and close mechanism |
|        |       | DG   | 6¼     | 1976         | – ✓ ✓ ✓ ✓   |          |
|        |       | SG   | 2005   |              | – ✓ ✓ – ✓   |          |

| IS large | 6¼    | TG   | 4¼     | 1969         | – ✓ ✓ ✓ ✓   | pneumatic with servo options and arcuate mold open and close mechanism |
|          |       | DG   | 6¼     | 1969         | – ✓ ✓ ✓ ✓   |          |
|          |       | SG   | 1969   |              | – ✓ ✓ – ✓   |          |
|          | 5½    | DG   | 5½     | 1967         | – ✓ ✓ ✓ ✓   |          |
|          |       | SG   | 1967   |              | – ✓ ✓ – ✓   |          |

| IS small | 5”    | TG   | 85 mm  | 1997         | ✓ ✓ ✓ ✓ ✓   | pneumatic with servo options and arcuate mold open and close mechanism |
|          |       | DG   | 5”     | 1985         | ✓ ✓ ✓ ✓ ✓   |          |
|          |       | SG   | 1985   |              | ✓ ✓ ✓ – ✓   |          |
|          | 4¼    | TG   | 3”     | 1977         | ✓ ✓ ✓ ● –   |          |
|          |       | DG   | 4¼     | 1950         | ✓ ✓ ✓ ✓ ✓   |          |
|          |       | SG   | 1927   |              | ✓ ✓ ✓ – ✓   |          |

| BIS     | BIS   | QG   | 70 mm  | 2014         | ● □ □ □     | full servo electric with parallel mold open and close mechanism |
|         |       | TG   | 95 mm  | 2013         | ● □ □ □     |          |
|         |       | DG   | 140 mm | 2013         | ● □ □ □     |          |
|         |       | SG   |        |              | ● ● ● ●     | not yet fully commercial |

- not available
✓ available
● on request
☐ planned
The servo electric driven NIS machine is the ultimate forming solution from 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 and 95mm QG together with the conversion features DG<->TG<->QG make the NIS the most flexible high performance machine available today.
### Standard Features

> FlexIS TS Control System  
> Servo Electric Gob Distributor  
> Cushioned Constant Cone Suspended  
> 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 RH/LH  
> 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

> InVertiFlow Blank Mold Cooling (DG and TG)  
> Blow Side Auxiliary Cooling  
> Vacuum Assist Blank Side  
> Variable Center Distance Tong Head VCD TG, QG  
> Integrated Dead Plate Guide Air  
> Plunger Process Control PPC (enabling closed loop control)  
> Temperature Control System TCS (enabling closed loop control)
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. The AIS machine provides the most cost-effective way to benefit from familiar technology, with the option of Servo Electric Take Out and Invert mechanisms.

Standard Options

- Servo Electric Invert SEI
- Servo Electric Take Out SETO
- FlexPressure System FPS
- Constant Cushion Blowhead
- Plunger Process Control PPC (enabling closed loop control)
- Temperature Control System TCS (enabling closed loop control)

Machine Features

- Control System FlexIS
- Servo Gob Distributor
- Delivery Suspension System DSS
- VertiFlow Blank Cooling, InVertiFlow Blank Cooling
- Quick Change Plunger Mechanism
- Quick Change Accessories
- VertiFlow Blowside Cooling
- Constant Cushion Invert & Take Out Mechanism
- Conveyor with Silent Chain
- FlexPusher
- High/Low Dead Plate Cooling
- Automatic Lubrication System
- Blow & Blow, Press & Blow, Narrow Neck Press & Blow
- Process Change DG⇔TG
- FPS Valve Technology

### Standard Options

<table>
<thead>
<tr>
<th>Height under finish</th>
<th>B&amp;B</th>
<th>P&amp;B</th>
<th>NNPB</th>
<th>B&amp;B</th>
<th>P&amp;B</th>
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<td>Minimum</td>
<td>110 mm</td>
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<td>110 mm</td>
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<td>Maximum</td>
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<td>304 mm</td>
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<table>
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<tr>
<th>Body Diameter</th>
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<th>NNPB</th>
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<tr>
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<table>
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<tr>
<th>Finish Diameter</th>
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<th>P&amp;B</th>
<th>NNPB</th>
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<tbody>
<tr>
<td>Maximum</td>
<td>48 mm</td>
<td>105 mm</td>
<td>48 mm</td>
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</table>
IS Machine

The oldest and 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 DG and 5” DG), and “large” section (5½ DG and 6¼ DG), each section type is available in single, double, and triple gob configurations.

Standard Options

- 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 (enabling closed loop control)
- Temperature Control System TCS (enabling closed loop control)

Machine 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
- Conveyor with Silent Chain
- FlexPusher
- High/Low Dead Plate Cooling
- Automatic Lubrication System
- Blow & Blow, Press & Blow, Narrow Neck Press & Blow
- Process Change SG➡DG or SG➡DG➡TG
- FPS Valve Technology
### Machine Type 4¼

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<tr>
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<th>Single Gob</th>
<th>4¼ Double Gob</th>
<th>3” Triple Gob</th>
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<td><strong>Body Diameter</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Body Diameter with VertiFlow</td>
<td>156 mm</td>
<td>76 mm</td>
<td>51 mm</td>
</tr>
<tr>
<td>Stack Cooling without Vacuum</td>
<td>178 mm</td>
<td>90 mm</td>
<td>52 mm</td>
</tr>
<tr>
<td>Maximum Body Diameter with Vacuum</td>
<td>170 mm</td>
<td>80 mm</td>
<td>45 mm</td>
</tr>
<tr>
<td><strong>Height under finish</strong></td>
<td>B&amp;B</td>
<td>P&amp;B</td>
<td>NNPB</td>
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<tr>
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<td>74 mm</td>
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<tr>
<td>Maximum (with VertiFlow)</td>
<td>341 mm</td>
<td>265 mm</td>
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<tr>
<td><strong>Finish Diameter</strong></td>
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<tr>
<td>Maximum</td>
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### Machine Type 5”

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<th>Single Gob</th>
<th>5” Double Gob</th>
<th>85 mm Triple Gob</th>
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<tr>
<td>Maximum Body Diameter with VertiFlow</td>
<td>156 mm</td>
<td>95 mm</td>
<td>60 mm</td>
</tr>
<tr>
<td>Stack Cooling without Vacuum</td>
<td>178 mm</td>
<td>102 mm</td>
<td>62 mm</td>
</tr>
<tr>
<td>Maximum Body Diameter with Vacuum</td>
<td>170 mm</td>
<td>95 mm</td>
<td>54 mm</td>
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<tr>
<td><strong>Height under finish</strong></td>
<td>B&amp;B</td>
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<td>NNPB</td>
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<tr>
<td>Minimum</td>
<td>74 mm</td>
<td>74 mm</td>
<td>–</td>
</tr>
<tr>
<td>Maximum (with VertiFlow)</td>
<td>341 mm</td>
<td>265 mm</td>
<td>–</td>
</tr>
<tr>
<td><strong>Finish Diameter</strong></td>
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<td></td>
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<tr>
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## Machine Type 5½

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<th>5½ Double Gob</th>
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<td>102 mm</td>
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<tr>
<td>with VertiFlow</td>
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<td></td>
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<td>Stack Cooling without Vacuum</td>
<td>178 mm</td>
<td>111 mm</td>
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<tr>
<td>Maximum Body Diameter</td>
<td>170 mm</td>
<td>102 mm</td>
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<tr>
<td>with Vacuum</td>
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<th>Height under finish</th>
<th>B&amp;B</th>
<th>P&amp;B</th>
<th>NNPB</th>
<th>B&amp;B</th>
<th>P&amp;B</th>
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<td>121 mm</td>
<td>–</td>
<td>68 mm</td>
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<td>Maximum (with VertiFlow)</td>
<td>380 mm</td>
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## Machine Type 6¼

<table>
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<th>Single Gob</th>
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<td>with VertiFlow</td>
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<tr>
<td>Stack Cooling without Vacuum</td>
<td>178 mm</td>
<td>130 mm</td>
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<tr>
<td>Maximum Body Diameter</td>
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<td>76 mm</td>
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<tr>
<td>with Vacuum</td>
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<td>115 mm</td>
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<td>Maximum (with VertiFlow)</td>
<td>355 mm</td>
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<td>343 mm</td>
<td>300 mm</td>
<td>300 mm</td>
<td>287 mm</td>
<td>268 mm</td>
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<td>Maximum</td>
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<td>120 mm</td>
<td>–</td>
<td>48 mm</td>
<td>90 mm</td>
<td>38 mm</td>
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BIS Machine

There is a huge potential for the BIS to become a 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 all the 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 have been build and are ready to go under glass to prove the features and outperform the pneumatic IS machines.
### 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 Lub-System with 4 zones
- Pneumatic Control Module
- Blank Side with FPS Valve Technology
- VertiFlow Blank Mold Cooling
- VertiFlow Blow Mold Cooling
- High low Dead Plate Cooling
- Pocket Air Finger
- Vacuum Assist Blow Side

### 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

- Special Adaptors to use up existing Molds (Type 4¼ DG, 3” TG, 5” DG, 85 mm TG, 5½ DG)
- Funnel Mechanism
- 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

### Dimensions

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<thead>
<tr>
<th></th>
<th>140 mm Double Gob</th>
<th>95 mm Triple Gob</th>
<th>70 mm Quad Gob</th>
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<tr>
<td>Minimum</td>
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<td><strong>Body Diameter</strong></td>
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<td>Maximum with Vertiflow Cooling</td>
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<td>65 mm</td>
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<tr>
<td>Maximum</td>
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**B&B** | **P&B** | **NNPB**
Gob Forming systems generate out of the constant glass flow from the forehearth a constant gob in weight and shape which is required for the 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 finish product.
Feeder System

The 555 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 555 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.

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 250 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
> Emhart Glass standard FlexIS technology
> Installs into new or existing applications
> Available with standalone or integrated controls

Features and Benefits

555 Feeder
> 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

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 individual plunger control mechanism is now ready for final testing in the Windsor research centre. The spin off of this new development is a new simplified feeder plunger which will eventually replace the aging 555 mechanism for all standard configurations where individual control of the plungers is not required. The new single drive 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 Equipment

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 a 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 a smooth transition of the gobs into the troughs. The 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 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.

Features and Benefits

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

Options
> Multi Gob Weight System
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 (energy waste) 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

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

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 down time

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
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 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 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 can also be 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, BP and BB
> Status visibility with large LED display

Configuration

PPC is available for the following Emhart Glass Quick Change Plunger Mechanisms

> 4¼ DG
> 5" DG
> 85 mm TG
> 5½ DG
> 6¼ DG (IS/AIS/NIS)
> 4½ TG (IS/AIS)
> 4¼ TG - 6¼ DG quick conversion
> 5" TG (NIS)
> 95mm QG (NIS)
FlexPressure System FPS

The 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 SIS/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 dependant 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
       Plunger Cooling
ED 19  Final Blow
       Finish Cooling
       Settle Blow
Temperature Control System TCS

The Emhart Glass Temperature Control System TCS is a pyrometer based system which monitors mold equipment on the blankside 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.

Features:
> Simple set up using integrated laser
> Warnings and alarms for out-of-range
> Storage of data
> Automatic swab detection

These temperature readings give the process transparency needed to reduce blank mold, plunger and neckring 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 sometimes require a prior installation review on site.
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.

A 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 personal. This improves start up time and allows the production specialists to focus on the important forming issues.

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.
SETO

The Take Out 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 Emhart Glass machine portfolio and in addition as Variable Center Distance VCD Tong Head.

The Servo Electric Take Out can be retrofitted to existing machines to reduce defects and improve the performance of the ware handling.

Features and Benefits

- Good access into the section through compact design
- Low maintenance – gearbox running in oil bath
- Easy handling with front mounted safety lock, tong close speed adjustment and take out height adjustment
- Available for all Emhart Glass machine configurations
- High reproducibility through servo controls
- Precise motion control and adjustment with the FlexIS process control system
- VCD Tong Head to reduce Ware Spacing and belt speed for improved ware handling TG/QG
- Fully integrated into the FlexIS
- Upgrades with FlexIS Standalone on existing lines

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 a consistent spacing onto the cross conveyor. A smooth motion is essential to avoid damage or loss of any containers during the transfer.

Both 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 and Benefits

178
- Reliable transfer wheel for up to 250 containers/minute
- Height flexibility with fingers easy to change
- The 178 is recognized for its low operation costs
- The Ware Handling Controller and the FlexVector can drive the ware transfer

478
- Precise and stable transport for high speed lines
- Reduces ware loss with pocket inserts which match the container shape
- Simplifies job change, setup and maintenance
- The Ware Handling Controller and the FlexVector can drive the ware transfer
**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.

**Features and Benefits**

- No pneumatics for any motion
- All motion controlled by servo motors
- Standard for SIS, IS, AIS and NIS Machines
- Fully integrated into the FlexIS
- Upgrades with FlexIS Standalone on existing lines
- Various finger spacing for SG, DG TG and QG
- Flexible finger liner concept
- 2 different finger heights
- Flexible finger liner inserts
- Vertical pocket air at the back plate
- No lubrication required
- Simple interface for motion profile adjustments - optimization made by plant personnel

**FlexPusher SP – Special Performance**

The FlexPusher SP Special Performance 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.

**Additional Features and Benefits**

- Full parallel container positioning before going onto conveyor belt
- Improved high speed ware handling
- Better handling of unstable ware (non-round)
- Reducing ware handling losses
Ware Handling Supervision (WHS)

The WHS ware sensing system, 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 bottle is reported on the FlexIS Production Counters

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 Emhart 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 Emhart Glass conveyors

Benefits

- Flexible
- Standard choice
- Universal
182 Cross Conveyor

182 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 182 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 height 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

182 Conveyor

The new steel conveyor aims to combine all the different customer needs. This new standard 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 182 conveyor has an integrated ladder.

Features

- New Steel Girder
- Integrated safety Ladder
- Dual controlled Wind box
- Height adjustable wind box
- Closer access to Blowside
- Fits all Emhart Glass machines

Benefits

- Increased robustness
- Safe and easy access to Blowside
- Balanced flow & adjustable pressure profile
- Standard
- Easier Blow side swabbing
- Universal
The new three axis 379 Stacker is a result of a joint development project. It is using the FlexIS control hardware from the IS machine. This enabled the introduction of a pioneering human interface with built in expert knowledge, allowing an easy set up of the new stacker without the need of "specialists". Performance is proven to handle high speed loading into the lehr.

The new three axis 379 Stacker will be the new Emhart standard and planned to be launched at the end of 2012.

**Features**

- 3 axis fully servo
- FlexIS 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

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.

Description

The FlexIS Process Control System is the core component that makes automation possible. 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 Process Control System takes into account the closed loop control strategies that will lead to dramatic 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
Conveyor and Stacker are servo controlled. This integrated system improves synchronization and flexibility. All the existing drive parts and gear box can be used.

This integrated FlexIS TS-E control system covers from the feeder to the stacker the complete glass container forming process and provides all the required operator interfaces.

FlexIS TS-E

> Fully flexible expandable control for IS, AIS, BIS and NIS machines

The FlexIS TS-E Expandable Timing System has been designed as an integrated Line Control System for IS and AIS machines. The 3 main parts are section control, machine control and ware handling control, using the same components and communicating by Ethernet.

The FlexIS TS-E is a scalable and expandable system adapting to the specific customer needs allowing future expansion.

The basic version is just a timer on section, were two servos for the FlexPusher can be easily added. In case of choosing the Servo Invert and/or Servo Take out the additional drives can be simply added. This is possible even later, during machine life, when such needs are requested. The same is valid for the FlexPressure System FPS.

The machine controller driving the five gob forming motors ensure precise and controlled motions for the servo tube rotation and tube height, servo feeder plunger, as well as servo shear and servo gob distributor.

The ware handling controller manages the different servo motors responsible for a smooth optimized container handling. Conveyor, Ware Transfer, Cross conveyor and Stacker are servo controlled. This integrated system improves synchronization and flexibility. All the existing drive parts and gear box can be used.

This integrated FlexIS TS-E control system covers from the feeder to the stacker the complete glass container forming process and provides all the required operator interfaces.

FlexIS Standalone 4.0

> Stand-alone for individual machine and section servo controls
> Including Feeder, Shear, Gob Distributor, FlexPusher, Servo Take out, Servo Invert

With the latest FlexIS cabinet design Emhart Glass has added the Servo Electric Invert SEI to the already available stand-alone (FlexPusher and/or Servo Takeout). Now any stand-alone configuration can be realized - Pusher (860 or FlexPusher), Servo Invert SEI and Servo Takeout SETO, from 6 to 12 sections. The Standalone Input 24VDC interfaces with opto-couplers which are triggered by the timing system drum events. Pusher start, Invert ON SEI, Revert ON SEI, Takeout IN SETO, Takeout OUT SETO, Kickback (Optional).

User interface is a Computer display. In addition all 3 mechanisms have local disable switches and override switches per section and an overall E-Stop.

> Main Cabinet, Controls and FlexPusher drives
> Extension Cabinet, SETO and SEI drives

If only one servo-mechanism (FlexPusher or SEI or SETO) is required, the control cabinet is reduced to the main cabinet.
FlexRadar

Over the last few years, 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 conveyer. 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 propriety 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 conveyer. 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 Emhart Glass Research Center EGRC. 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 FlexIS

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 the today required flexibility

Unprecedented production flexibility can be achieved by operating the 555 Feeder and 565 Shear with the new 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, whilst 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 mould 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.
**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.

**PPC 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 FlexTernal. 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 allows for controlling each section half individually. Nevertheless it is possible to measure all cavity halves per side and use the average as measurement input for the closed loop.

FlexIS Blank Cooling Control is initially designed for equalizing slow changes in production parameters. The plot shows the successive activation of the closed loops for half an AIS machine. Generally the temperatures can be kept in a very narrow band with the closed loop.
Emhart Glass Refractories for Glassmaking

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.

Forehearth and Feeder Products

High quality refractories are crucial to proper conditioning of molten glass. Emhart Glass forehearth refractory components are designed for long life with predictable heat loss characteristics and resistance to thermal shock, erosion, and corrosion. The range of forehearth components includes both substructure and superstructure. We also manufacture distributor shapes, alcoves, doglegs, and colorant sections. Emhart Glass also manufacturers a full range of feeder refractories, including spouts, tubes, plungers, and orifice rings. Feeder refractories are available in a variety of materials to address each customer’s individual needs.

Exclusive Refractory Products for the Handglass Industry

The ability to match our proprietary mixes to our customers’ melt and firing needs has enabled Emhart Glass Owensville to serve a wide spectrum of glass industries. Today, Emhart Glass is a leading manufacturer and supplier of Glass House Crucibles, used exclusively in hand glass shops throughout the world. This highly specialized product line demands meticulous
**Feeder Expendables**

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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. Emhart Glass also offers a complete line of refractory accessories designed specifically for the hand glass industry.

**Quality Engineered Feeder and Refractory Expendables**

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 service the individual requirements of each customer, no matter what type of glass they manufacture. What’s more, we can provide a level of customized service normally unavailable from other refractories manufacturers.

We’re a division of the global Emhart Glass enterprise, so we can leverage the continuing evolution in glass making technology from the industry leader. For example, the patented 555 Feeder Mechanism includes a self-centering tube holder and orifice ring pans with engineered refractory rings for consistent quality and efficient production. Emhart Glass offers a full range of standard refractory shapes, and also manufactures unusual, complex, and small quantity shapes to the same exacting tolerances.

**The Industry’s Widest Range of Glass Refractory Expendable Compositions**

Emhart Glass continues 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 the full range of shapes in industry standard compositions including 333, 315, 311, 338, and 345.

For applications demanding customized compositions, our unrivaled research and development capabilities enable us to devise formulations to achieve specific customer objectives.

**Quality Driven**

Since 1927, Emhart Glass has been developing and manufacturing high quality refractories for the glass container industry. The Owensville plant has manufactured refractories since it was purchased in 1980 from the Laclede Christy Refractory Company. Laclede Christy was founded in 1844 and built a strong reputation as a refractory maker. Before becoming a refractory plant in 1976, the Owensville plant had specialised in the production of glass pot refractories. Once Emhart Glass purchased the plant, the company closed its other refractory operations and concentrated all production in Owensville – a setup that has been maintained to this day.

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 being formed 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 customer service team responds rapidly to provide knowledgeable assistance to help our customers eliminate downtime and maximize production efficiency. Emhart Glass continues to grow by serving the glass making industry with time-honored craftsmanship, world-class innovation, and service to customers.
Container Inspection

Emhart Glass delivers 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, 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.

Emhart Glass inspection systems are intelligently designed for ease of operation with minimal operator intervention.
Machines

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. 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.

FleXinspect

Emhart Glass offers a new tool for glassmakers that will increase efficiency and reduce costs. This combined, stand alone system allows 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.
# Machine Overview

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X = standard inspection  
O = 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 BC

A reliable and uniquely configurable platform that easily allows additional inspection functionality and redundancy as required. The FleXinspect BC provides unmatched modular versatility, value, and flexibility for glassmakers’ current and future requirements. As a member of the FleXinspect family, the BC can be used in concert with the FleXinspect T to create the most comprehensive inspection solution in today’s market.

With the same reliable and unique configurations of inspections, the FleXinspect BC can be ordered separately as a B and / or a C in cases where the customer requirements are such that some inspections are not needed or the line configurations demand two individual systems. All the inspections and options are the same.

Comprehensive Vision Inspection

The proprietary design of the FleXinspect BC includes 360-degree wrap around 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. Combined standard and optional inspections capture and correlate up to 24 individual views of the sidewall, plus sealing surface, base, base stress, vision plug, wire edge, vision dip, and mold reading.

> Unmatched inspection accuracy
> Maximum throughput at minimum speed
> Reduced job change downtime
> Optimized container stability at high speed
> Inspection system for all your vision inspection needs
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

Reduced Job Change Downtime

- Inspection setup wizards for accurate repeatable changeovers
- Simplified mechanical adjustments for quick and easy setup
- Self learning tools with pre-programmed defects and sensitivities for specific types of defects

Available Inspections B

- Sealing surface
- Base
- Base stress
- Vision plug gauging
- Wire edge
- Vision dip/saddle
- Mold reading
  - Bottom up mold reading
  or
  - Top down alpha code/bottom dot reading

Available Inspections C

- Opaque sidewall defect (6 views) with dimensional inspection
- Transparent sidewall defect (6 views)
- Sidewall stress with polarized lighting (6 views)
- Shoulder inspection (6 views)
  - Opaque shoulder
  or
  - Stress shoulder

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
- Precision conveyors for smooth transfer through the inspection areas of the machine
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 and maintenance
- 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 with no need for tooling

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/Height
- Base
- Base stress
- Sidewall
- Sidewall stress
- Sealing surface
- Vision base mold code reader for defect correlation
- Vision wire edge detection
- Wall thickness measurement Chromatic light
- Non contact 2- point out of round (ovality)
- Dimensional (lean, height, diameters)
Type "M"

The machine Type "M" was designed with a simple goal: be the best stop-rotate-check inspection system in the market.

The Type "M" is designed to integrate into the customers’ existing line layouts with little or no change to existing conveyor systems and plant layouts.
Designed to stand next to a cold end single-line conveyor, the new type “M” can be installed almost anywhere. A major difference in the way this machine operates, compared with others, is the way the extra-long, servo-driven infeed screw extends over the existing single line conveyor and pulls the ware onto its own inspection conveyor and into the starwheel. The machine also enables the single line to work as an active bypass conveyor: simply swing the infeed screw assembly out of the bottle path. Although bypassing an inspection machine is not recommended by Emhart Glass, this new design strategy is a big space- and cost-saver for those plants that still wish to be able to bypass an inspection machine.

Today’s standard type “M” machine is equipped to perform modulated check inspection, heel dot code mold number reading, mechanical plug, ring, dip, saddle and height. The standard machine is also equipped with two servo-driven rotate devices and can support up to four rotate devices, if required by added inspections.

To help ensure that the type “M” machine provides the best inspection and container handling performance available, every machine is provided with an integrated precision conveying system. To install a type “M” in the field, customers simply need to find enough space along a straight section of the single line where the machine is to be placed. Because of the unique design, there is no need to break the existing conveyor for installation. Additional features, such as failsafe rejection, security logging, remote access, and device hardware managing, are also part of all of the Emhart Glass inspection machines.

**Standard Inspections**
- Modulated Check Detection
- MNR - Heel Dot Code Reader
- Mechanical Plug/Ring
- Mechanical Dip/Saddle/Height

**Additional Inspections**
- Chromatic Wall Thickness (4 position)
- Mold number reader - Alpha/Bottom
- Sealing Surface
- Base
- Vision Plug
- Vision Ring
- Vision Dip/Saddle/Height
MiniLab

The Emhart Glass 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.

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
The MiniLab is a complete turnkey solution for statistical sampling of glass containers. The MiniLab not only ensures adherence to critical quality criteria but also reduces plant labor via automation while improving measurements accuracy and repeatability. The MiniLab’s flexible and scalable design lets glass manufacturers integrate multiple devices to serve specific quality control requirements.

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 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)

Of course, 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.

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

The 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

The 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, the MLP can be equipped with the Capacity Gauge. When equipped with this option the 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.

The 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 stainless steel frame, the 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. The Mold Code Reader automatically read 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. The Data Collector collects all measurements from the MiniLab in a database for archive and further analysis. It comes with SPC tools and custom analysis software to review historical data and production trends.
The Emhart Glass ProLab is designed to accurately measure a variety of critical glass container dimensions in the hot end, providing valuable product quality information where the bottlemaker can take immediate action.

**Benefits**
- Accurately measures container dimensions in the hot end, where the bottlemaker can take immediate action
- Significantly reduces the response time to forming process anomalies
- Designed to withstand the hot end environment
- Eliminates the cumbersome and time-consuming manual quality-control tests performed in the hot end
- Includes onboard database storage and SPC tools to review historical data and perform trend analysis
- Connects to a factory information system, closing the loop to a plant-wide process improvement system

**ProLab**
The ProLab provides fast, accurate, semi-automated dimensional measurements for a wide range of glass containers in the hot end. It is specifically designed to measure dimensions of the container including height, diameter, all finish dimensions, finish tilt, bent neck, lean, internal bore, and glass thickness; Information traditionally coming from the cold end.

**Operation**

The ProLab is equipped with a high-precision laser system to perform all external dimensional measurements. In addition, a non-contact chromatic glass thickness device measures the wall thickness of the containers. The glass thickness sensor is mounted on a linear positioning slide which automatically moves the sensor to the correct distance from the glass surface for full 360 degree measurement of round and non-round containers.

Containers up to 250 °C are manually placed on the temperature resistant table with an elevator lowering the container to different locations in front of the measuring devices. During the container 360 degree rotation those two measuring devices continuously capture information to calculate the absolute measurements for the corresponding locations.

**User Interface**

Beside its high-precision measuring capabilities, an important feature of the ProLab is its intuitive user interface. Live graphical representation of each measurement is displayed on the touch-screen monitor providing real-time feedback. When measurements fall outside pre-determined limits, icons change red while measurements within specification show up in green. If the operator requires more information he simply touches an icon on the screen to view a more detailed graph. Throughout the various screens the user can zoom into the data and pan around with ease.

**SPC tools**

To complement its capabilities, the ProLab comes standard with onboard database storage and data analysis software to review historical data and perform trend analysis. The system offers built-in ability to display SPC control lines for specific cavities or the complete machine and calculate process improvement variables (average distribution, standard deviation and various other key performance indicators).

In addition, when connected to a network all measurement values are available to a factory information system for further processing and custom reporting.

**In conclusion**

The ProLab provides valuable product quality information where the bottlemaker can take immediate action, thus significantly reducing the response time to possible anomalies. Further more, by reducing the feedback time to the hot end operator the ProLab is a very effective tool in bringing the forming process to target pack-to-melt and shortening the actual job change time.

With a relatively small footprint of just 1200mm by 650mm the ProLab easily finds its place in any hot end.
Emhart Glass provides its customers with an Upgrade and Rebuild path to help preserve earlier investments with longer life and improved inspection capabilities.

Industry workhorses such as the Veritas iM, SuperScan and CIM all have a number of Machine Upgrades and Inspection Options to choose from.

**Veritas iM Upgrade Options**

Existing Veritas iM customers can enhance their equipment by upgrading different options with new state of the art inspections and operational enhancements including:

> **Modulated Check Inspection**
  Offers selectable focused light patterns for different check types. Eliminates sensor masking thus improving overall check setup

> **Reject Verify Kit**
  Checks and Verifies when defects are rejected into the cullet chute

> **Chromatic Wall Thickness**
  Features easy to use non-contact Chromatic sensors providing quicker setup and position flexibility
**CIM Computer Console to Qualitrac Upgrade**

Older CIMs and Defect Tracers can be Rebuilt or Upgraded to QualiTrac providing customers with quicker Job Changes and more accurate Check setups. Mold correlated defect and production data can also be easily transmitted to the Customers Production Control System.

**Superscan to SuperScan Digital Upgrade**

Older SuperScan models 2 and 3 can be rebuilt or upgraded to the “One Box” design featuring High Resolution Cameras, new electronics and updated inspection algorithms. A host of Options are also available including AC Motor Upgrade and various Lighting Options.

**Parts**

The importance of spare parts to the glass industry is a major focus of the Emhart Glass business portfolio. To provide better service to our customers Emhart Glass maintains stocks of spare parts both in the Americas and Europe, thus ensuring faster delivery.

**S-Class Parts**

Please refer to page 62 for more information on our spare parts program logistics.
After Sales

With a team of around 100 specialized staff based at 14 locations around the world, our After Sales Business Unit works alongside our sales team to address technical issues and build stronger partnership with our customers. The division is made up of four segments:

- Parts Services
- Customer Service
- Training
- Customer Process Support
Parts Services

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. 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. Emhart Glass offers repair services for a wide range on components and supports customers with the selection and definition of repairs. 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 provide additional services to quickly find the right parts for every job.

Portfolio

Our parts portfolio comprises around 150,000 parts for Refractories, Hot End equipment and Inspection machines. We support the full range of Emhart Glass products, including legacy equipment – covering almost the full 100 years of our history as glass-making innovators. Since the interfaces we originally designed have been 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.

Of course, quality parts only benefit you once you receive them. And with logistic centers at Sundsvall, Elmira and Owensville, we offer just about every part you’ll ever need from a ‘one stop shop’, ready for rapid despatch to your door.
S-Class Program

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 frequently requested and most important parts for Hot End and Inspection machines are always available directly from the shelf, ready to be shipped within 48 hours of ordering.

Refractory S-Class parts can be finished to your own configuration and shipped within eight working days. Rapid delivery is ensured by our partners’ global logistic network.

S-Class allows you to reduce inventory to a minimum, releasing capital for use elsewhere. And you can rest assured that every item will always be the latest version, in perfect condition, with the normal Emhart Glass warranty.
Inventory Management

The cost of holding stocks of spare parts and accessories at the plant level is a significant but often under-estimated element in the lifetime costs of an IS machine. Given the enormous range of parts needed to support an IS machine, inevitably the stock at the plant, however extensive, will contain the wrong items. The consequences are often expensive downtime which could have been avoided, and a store full of infrequently-used items whose value is rapidly deteriorating. Not a recipe for success.

Fortunately, there is a better way. Emhart Glass maintains such an extensive stock of parts, and can supply these so quickly, that plants can rely on this central stock to meet the majority of their requirements. This is particularly true for the S-Class selection of parts whose delivery time can be guaranteed. We offer to carry out an analysis of the stock holding of a plant and to indicate where savings could be made, without any cost or commitment to the customer. You may be astonished at the potential savings which are waiting to be uncovered!

Customer Contact Parts and Web Shop

The cooperation between Emhart Glass and our customers depends greatly on efficient communications. In each sales location, the Customer Contact Parts (CCP) 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.

Before the end of this year Emhart Glass will launch a second channel for ordering parts, as well as for tracking the order status. The new Web Shop will provide 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.
Repairs

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 made good 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. Emhart Glass offers a repair service for a wide selection of equipment, ranging from entire Gob Distributors to components of the control system. All repaired items come with a one-year guarantee.

For extended repairs of Feeders, Mechanisms, Sections and/or Machines Emhart Glass offers two distinctive approaches:

**On-Site Repairs**

An experienced crew performs the agreed repair in the customers 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 down time is achieved.

**Off-Site Repairs**

In cases the equipment anyhow changes its position and/or in cases the repair is combined with a major upgrade, Emhart Glass offers the repair/upgrading to take place in the workshop of one of our repair partners, preferable at Ergon Mechanica in Dego - Italy.

**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. Emhart Glass has 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 Emhart Glass representative for more details.
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 identifying individual items one by one.
Customer Service

Dedicated, highly skilled engineers offer support with everything from installation and commissioning through to 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 (focused on equipment updates and/or training).

24/7 Emergency Assistance

For production critical emergencies our 24/7 Emergency Assistance offers you phone assistance around the clock by experienced Service Engineers. If necessary, we dispatch a Service Engineer for an urgent on-site service.

FlexIS Remote Service

Within a short time, FlexIS Remote Service has established itself as an important pillar of our Customer Service. FlexIS Remote Service is available during European office hours in German and in English. The service contract is now quoted for all new FlexIS installations in Europe, Middle East and Africa. The next phase of FlexIS Remote Service is already ongoing. By connecting process control systems like PPC to FlexIS Remote Service, we will be able to offer you remote production assistance.

Audit

Mechanical, electrical and production Audits ensure that subsequent upgrades, repairs, conversions or new production processes can be planned and implemented smoothly.
**Production Assistance**

Our team of forming specialists offers you 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

**Repairs & Upgrades**

Repairs and Upgrades keep your equipment in top condition and protect your valuable investment.

**Installation & Commissioning**

For Installation & Commissioning (cold run) of your new machine line, choose between “Installation Supervision” by our experienced Mechanical and Electrical Service Supervisors or a “Full Installation” package.

**Start up Assistance**

Select Start-up Assistance (hot run) according to your needs by an experienced Mechanical & Electrical Service Supervisor and optionally one of our Forming Specialists.

**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 Emhart Glass Forming Specialist familiar with the specific situation of your plant operation.
Customer Process Support

Emhart Glass provides glassmakers with support services to aid in the design, production and quality control of glass containers. Emhart Glass' Process Customer Support team combines the latest numerical technologies and years of glassmaking measurements and experience to provide practical, representative simulations that glassmaker can use and benefit from.

Accessory Selection

(Mold Design Interface Specification)
For your specific containers, Emhart Glass specifies the best Mold Design Interface, and selects the various accessories required for an optimal mold clamping and cooling.

Container Producibility Analysis

> For your specific container, Emhart Glass determines the feasibility of particular and special design features and provides advice
> Combining production and design interests at an early stage
Forming Simulation

For your specific round container, Emhart Glass simulates the forming process, from blank loading, parison formation, invert, final blow to mold open. For practical relevance, the forming simulation is calculated using your real data such as glass composition, machine timing, gob and mold temperature.

Container Property Analysis

Container performance is assessed by static and dynamic stress simulations for:
> Internal pressure (carbonated products, vacuum, surge)
> Vertical load (capping force, warehouse stacking)
> Pendulum test (predict impact trade strengths)
> Filling line collisions simulation, using real line speeds

Mold Cooling Analysis

Emhart Glass uses a proprietary technology involving 3D Finite Element Analysis technologies. Starting from existing mold design and production data, Emhart Glass calculates the mold temperature distribution and provides in-depth analysis for potential improvements.

Mold Equipment Drawing Set – Premium Suite

A full package of mold equipment drawings is provided for one particular container, considering all the parameters resulting from:
>
> Accessory Selection
> Mold Cooling Analysis
> Forming Simulation

Optional Production Assistance can be provided for initial sampling.
Training

Our fully qualified training team helps customers worldwide (and our own staff) get the very best out of Emhart Glass equipment. Hands-on instruction is available in several locations around the globe, with classroom training available at many 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.
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 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.

Emhart Glass Inspection Competency Centers

In order to accomplish the challenging task of providing regional support as a Global company, 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 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.
About us

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.
Insights

When you choose 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 100 years’ experience.

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.

During the 1920s we introduced the first IS machine. Having expanded overseas in the 1950s, we created new electronic controls in the 1970s and introduced our Total Inspection Machines TIM in the 1980s. In 2000 we began marketing our Next Generation IS machines NIS, the world’s first servo-electric glass forming machines followed by the BIS machine in 2012.

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, Emhart Inex offers 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, drinks 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, 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.

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.

As well as supporting our customers, we support our own people too. 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.
History

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 tableware.

1940 The first double-gob equipment is introduced.

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


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.


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.

1991 The first six-section IS machine is introduced, along with the HE-127 automatic finish check inspector.

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

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 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.

2008 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 and cross-conveyors and the fabrication of welded parts, with facilities for warehousing, training and demonstrations.

2011 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.
From our earliest days, the success of Emhart Glass has been based on innovation. Today, we continue to invest in the developments that will shape the future of the glass industry.

Our Research and Development work focuses on improvements in key areas such as container strength, automation, efficiency, ease of use and reliability. As partners to an industry where environmental concerns are paramount, we’re also exploring priorities such as energy economy, machine recycling and reduced cost of ownership.
Container Forming Research and Development

Our Container Forming Research and Development function aims to develop new processes and products that will deliver better automation, improved productivity for our present and future clients.

Over the next few years, we plan to introduce products that will allow glass manufacturers to achieve higher production speeds and fewer defects, which in turn will result in increased asset yield.

Improving the quality and resilience of glass containers is a key priority for us. In addition, higher levels of automation will result in reduced process variation, paving the way for both increased productivity and better product quality.

Our Container Forming Research and Development department employs engineers from six locations: Sundsvall (Sweden), Örebro (Sweden), Cham (Switzerland), Dego (Italy), Johor Bahru (Malaysia) and our dedicated Research Center at Windsor, CT (USA).

Container Inspection Research and Development

No other company offers the same level of Container Inspection experience combined with a proven commitment to product development.

As part of our ambitious plans to develop our Container Inspection business, our Engineering Research and Development facility is located at St. Petersburg, FL (USA). The facility houses all our Container Inspection product and software development engineers and features a prototyping machine shop and full production speed test labs with multiple loops for simultaneous testing. Here (see also EGRC), complete inspection concepts are tested and proven before being passed to our manufacturing facility at Elmira, NY. At St. Petersburg a dedicated group of engineers specialize in Container Inspection mechanical design, software development, lighting, optics and applications engineering.

Emhart Glass Research Center (EGRC)

The Research Center EGRC includes a complete production line for the manufacture of glass containers, which allows us to move our industrial proven products forward and as a result help move the glass industry forward. We have taken our research and development to a new level in both the Hot End and Cold End. The facility continues to provide a state of the art development venue based in an industrial environment to test our product ideas for both Hot End and Cold End applications. These applications include enhanced glass-forming methods, increase automation and improve yields through fundamental process understanding developed at the EGRC.

In addition, significant gains have been made and will continue to be made in the area of increased glass strength. This will be the catalyst enabling various products that had been lost to competitive packaging to come back to glass which will help the industry grow in the future.
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