BIS – Best from NIS and AIS

Emhart Glass Control Systems

Exploring New Materials for Parts in the Glass Industry
FleXinspect. Configurable inspection technologies for reliable process control

Configurable and Total
> Up to 9 rotate stations
> Servo driven technologies

Powerful and Reliable
> Nema 12 enclosed electronics
> Total defect to mold correlation
> Servo rotators

Simple and Flexible
> 19” simplified human interface
> Ergonomic maintenance access
> High speed wide ware range

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Emhart Glass SA · Hinterbergstrasse 22 · CH-6330 Cham 2 · Switzerland · Telephone: +41 41 749 42 00 · www.emhartglass.com · Europe, Asia, USA
These are exciting times for me to return to Emhart Glass and to the Glass Container industry. The worst of the economic crisis seems behind us, and the challenge has shifted from managing operational expenditures and overcapacities to catching up with sharply increasing market demands.

Emhart Glass’ strategy not to substantially cut R&D spending during the economic downturn is now paying off. As could be seen at last year’s Glasstec in Düsseldorf, our pipeline of innovative new products and solutions is full, and we are well prepared to meet our customers’ challenging requirements. This edition will cover some upcoming highlights, such as our servo-driven BIS machine, offering unmatched flexibility, new standalone controls products, facilitating the transition to servo technology or the FlexPusher SP, the answer to applications with high-speed conveyors.

With our commitment to innovation, we are now setting course for topics that will challenge our industry in the future. The increasing importance of health and safety or the difficulty many plants are facing in hiring experienced personnel are just two examples. In order to address such needs, we are currently working on concepts that will further improve operator safety, and we are developing controls and user interfaces that will make the use of our machines much simpler.

The strong expertise within our company and the unique capabilities in the Emhart Glass Research Center give me the confidence that we will continue supplying exciting and value-adding products in the future.

With best wishes,

Matthias Kümmerle

We are now looking back on one of the most difficult periods ever faced by the whole glass industry, which started in mid-2008. This situation forced the industry to adapt its production capacities to the lower demand and to consolidate. Investments were significantly reduced or postponed.

After two years of downturn, the situation improved significantly in 2010. This is reflected in the detailed market analysis which you can find in this magazine. As a consequence, the investment mood has turned around, with Glasstec 2010 marking the starting point of a new investment wave. Projects which had been on hold have now been revived, and new projects have been created. The glass industry, which has the reputation of being rather slow, has proven that it can react really fast to changing market situations, both to reduce or to build up production capacity. We at Emhart Glass will prove that we are also prepared for this sharp increase in demand.

During the downturn, Emhart Glass did not reduce its research and development spending, and this is now paying off. The new products and services we offer for container forming, container inspection and refractories will support the continuing quest for increases in productivity and quality in the glass industry.

A new face now represents the technology progress of Hot End products: early this year the new Vice President Technology, Dr. Matthias Kuemmerle, rejoined Emhart Glass, after spending some years gaining experience in another industry. He therefore has a track record outside as well as inside the glass industry. He has proven that his passion is to bring innovative solutions to the market, with real benefits for the daily life in the glass plants, in order to increase efficiency, quality and safety.

The crisis is over, and we are keen and prepared to support our customers with products and services during the upswing. This PPS magazine gives you an update of our offering and our capabilities, together with our view of the current situation and the future of our industry.

I wish you pleasant and informative reading.

Martin Jetter

Martin Jetter
(President Emhart Glass)

Dr. Matthias Kümmerle
(VP Technology)
Events 2011

25. - 26. May
Glassman Europe
⇒ Barcelona, SPAIN

06. - 09. June
Mir Stekla
⇒ Moscow, RUSSIA

29. - 30. June
⇒ Köln, GERMANY

01. - 05. June
Glass Art Society 41st Annual Conference
⇒ Seattle, Washington, USA

19. - 20. October
Glass Problems Conference
⇒ Ohio, USA
When Quality is discussed within any organisation, there are always a number of opinions. One individual’s perception can differ from another’s due to historical events and culture but the underlying fact is that the answers given are always without doubt expressing one’s satisfaction level.

During 2010, a strategic decision was made to increase the focus on Quality and dedicate a stand-alone organisation within Emhart Glass to Global Quality. The newly formed Global Quality group is not restricted to investigating only product functionality and lifetime issues, but today has the responsibility to investigate and address Quality issues regarding all aspects of our interaction along with supply of products and services to all customers. For this reason there are now three legs within the Global Quality Group: ‘Hot End’, ‘Inspection and Refractories’ and ‘Process Assurance’.

The Hot End and Inspection / Refractory legs of the organisation will be responsible for the technical side of the Quality initiative related to their individual areas but are already working together to ensure that vital knowledge is transferred between the groups for standardisation as required. The Process Assurance group is today focussing on the Quality of the processes that make up our day to day interaction and work.

The task is a great challenge with potentially huge rewards internally and most importantly for our customers to know that their equipment supplier and partner has Quality as a top priority. The Global Quality Vision ‘to ensure that customer satisfaction is the guiding principle and has the highest priority throughout Emhart Glass’ is set and the journey is underway.

Do we believe we can improve? Without a doubt. Continuous improvement is at the heart of Emhart Glass.

Areas such as responsiveness, proactivity, communication and product quality are just some of the elements within the continuous improvement program.

One of the first steps to improve communication and to increase response time will be the introduction of the new ‘Quality Connections’ portal which will enable our customers to report Quality issues directly into the Emhart Glass organisation with a detailed content. The system will then allow users to view the status and add inputs as required until agreed resolution. We will also be measuring our customers’ satisfaction level to ensure that we indeed made the relevant changes to our supply and services.
The Glass-Alliance

The Glasstec 2010 exhibition in Düsseldorf, Germany was a big event for the Glass-Alliance. The four members of the Glass-Alliance each prominently represented the joint organization on their booths. We were able to strengthen existing contacts and had many spontaneous meetings with new customer contacts that were subsequently followed up. On Thursday of the Glasstec week, the General Manager William Grüninger gave a lunch speech to introduce the Glass-Alliance to a larger audience.

Undoubtedly the “Glass-Alliance” has, after a very short time, become a strong brand receiving world wide recognition. The number of project proposals developed has reached a high level, well exceeding the initial expectations. Key factors for this significant success are:

**Technical Competence**
Each of the four members is a technology leader in its field, and provides the core technologies ensuring successful start-up and operation of glass container plants.

**Seamless Integration**
The Glass-Alliance members cooperate closely at management level as well as between specialists, and this facilitates a strong commitment and a deep know-how to provide seamless glass container plant solutions.

**Integral Project Management**
The Glass-Alliance provides strong, competent overall project management covering all aspects from basic engineering, detailed engineering, construction, commissioning, start-up and handover. This bundled approach effectively minimizes the customer’s project risk, whilst substantially reducing the administrative effort by the investor.

**Independence**
As the four Glass-Alliance members are all technology suppliers to the glass container industry, independence of any potential competitor of the customer is fully guaranteed.

**Global Presence**
Each of the four members has a long-standing tradition of being globally present. With the teaming up in the Glass-Alliance this worldwide network has become even more extensive and closely meshed.

The Glass-Alliance stands for optimal solutions, independence, innovation, expertise, stability, and global presence. It aims to offer clients the core of their new glass container production facilities from a single partner taking a holistic approach.

For regular updates on the latest developments of the Glass-Alliance, please visit www.glass-alliance.com.
HORN opens
Middle East Service Centre

Due to the increasing demand in the Middle East region, HORN has decided to open a service centre in Ras Al Khaimah together with Glass Source FZC. The objective of this service centre is to offer the customer the highest level of technical service and support. The following team of five experts are at the customers’ disposal:

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<th>Person</th>
<th>Department</th>
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<tr>
<td>1) Mr. Josef Dietl</td>
<td>Head of Furnace department</td>
<td>German – English</td>
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<tr>
<td>2) Mr. Goran Johansson</td>
<td>Head of IS machine department</td>
<td>Swedish – English</td>
</tr>
<tr>
<td>3) Mr. Farid Ghafourian</td>
<td>Mechanical Engineer</td>
<td>Farsi – English</td>
</tr>
<tr>
<td>4) Mr. Farhan Ashraf</td>
<td>Control Engineer</td>
<td>Urdu – English</td>
</tr>
<tr>
<td>5) Mrs. Manar Maher</td>
<td>Secretary</td>
<td>Arabic – English</td>
</tr>
</tbody>
</table>

The contact details of the HORN Middle East Service Centre are:

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Technical News Bulletins

In the past six months the following Technical News Bulletins TNB have been released and emailed to our customers. If you wish to be added to the mailing list please send an email to: registernews@emhartglass.com

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All the Emhart Glass Technical News Bulletins are stored on our website www.emhartglass.com in various languages.
NEWS

In early May this year, we were pleased to announce a new joint venture with Shandong Sanjin Glass Machinery Co. that will open up exciting opportunities for both companies in the fast-developing Chinese market.

Sanjin is based in Zibo, in Shandong Province, China. Originally a state-owned enterprise, it became a privately held company in 2004. Since then, it has grown rapidly, reaching sales of RMB371 million (around €40m) and around 1200 employees by 2010. Today, Sanjin is China’s undisputed market leader for container glass machinery and equipment.

Under the joint-venture deal, which is subject to approval by the Chinese authorities, Emhart Glass will acquire a 52% equity interest in Sanjin and subscribe to a capital increase bringing its final holding to 63%.

The joint venture offers a perfect fit in terms of product portfolio. While Sanjin focuses on low-cost glass forming machines, forehearts, annealing lehrs and palletizers for the domestic market, Emhart Glass imports more advanced glass-forming and inspection machines.

‘I’m delighted that we have finalized this joint-venture deal, which will be hugely beneficial for both parties,’ comments Martin Jetter, President of Emhart Glass. ‘Strategically, our aims are perfectly aligned, and our product ranges are highly complementary.’

New Chinese joint venture with Sanjin
At the moment, most of the Chinese market for glass container manufacturing machinery is served by local manufacturers. While machinery prices are very competitive, standards of technology and performance have not yet reached the same level as the more developed markets served by Emhart Glass. Many manufacturers use visual inspection rather than automated inspection technology.

However, the demand for high-quality glassware is growing in China. Strong economic growth is one reason. Another is the decision of many international breweries to locate their production in China.

By working together, Sanjin and Emhart Glass can make best use of each others’ strengths to serve this rapidly developing market by providing both forming and inspection machines that are tailored to the expectations of customers in the Chinese market. ‘We feel this joint venture is the ideal way for both companies to meet local demand for efficient, accurate glass production for the years to come,’ says Martin Jetter. ‘The combination of Sanjin’s cost-effective equipment and our advanced technology will create a major new force in this fast-developing country. It will set new standards, for glass forming as well as glass inspection.’

The new venture will operate independently of the Emhart Glass group, under the Sanjin brand name, and the Sanjin management team will be retained. We will provide additional management expertise and technology know-how.

Watch these pages for more news of the joint venture as it unfolds.
Trustedglass makers help glass makers reduce defects and improve quality, as well as reassuring fillers that they are getting quality glass containers. With defect detection now developed to a level that exceeds the needs of most customers, the focus is shifting towards improvements in process control, reducing production costs and enhancing ROI.

We have been making automated glass container inspection equipment for almost 70 years. With the introduction of the Type 74 Check Inspector in 1945, we were among the first companies to be granted a US patent for an inspection device. Today, we are the only provider to offer such deep and wide-ranging expertise in both container forming and container inspection, allowing us to deliver integrated whole-line solutions that are 100% focused on quality, speed and accuracy.

Our inspection division combines the technical heritage of three different firms: Emhart Glass, Powers and Inex. Powers, founded in 1958, developed the push-bar stacker, the plug gauger and the check detector, quickly developing into a major global player in Cold End inspection. It became part of Emhart Glass in 1982. More recently, in 2007, we welcomed ICS Inex, the highly regarded developer of inspection solutions for the pharmaceutical, food and general packaging industries. Key Inex products included the SuperInspector, the Prolaser and the SuperScan.

Our inspection manufacturing capability centers on a single site: our facility at Elmira, New York. This plant employs a total of 126 people, 76 of them in manufacturing, and boasts 6011 square meters of production space. Here we develop and manufacture our ground-breaking vision inspection machines and automated online testing laboratories, as well as spare parts, accessories
and upgrade kits. Elmira is a completely integrated setup, with raw-material handling, precision machining, assembly and testing all carried out in-house.

The newest product of Emhart Glass is the FleXinspect, which offers a range of inspection functions in a single machine, with a modular design that allows for simple expansion. This future proofed design makes FleXinspect a natural choice for customers who are setting up quality control processes for the first time, and who need the assurance that they can add more functions as and when required.

Beyond the production line, our MiniLab system offers a flexible configuration of automatic sampling equipment, including the Emhart Glass ISIS Dimensional Measurement System and the MLP+ pressure and capacity tester. It automates several of the normal routine dimensional and strength measurements performed by Cold End quality control personnel. MiniLab delivers vital savings for customers who work to the very highest standards of quality and want to use all available information to develop and refine their production processes.

Pursuing the goal of better process control, we have recently begun to explore the options for ‘closed loop’ monitoring systems – an avenue that became relevant once Emhart Glass started offering complete ‘end to end’ manufacturing solutions. In ‘closed loop’ monitoring, data from our inspection technologies are used to control and maintain key Hot End production parameters. A prototype has been developed that integrates the FlexIS Control System and TCS Temperature Control System on an Emhart Glass NIS machine, automatically adjusting blank mold cooling to maintain a preset temperature. Initial tests show very promising results in terms of product quality and reduced numbers of rejects, and a commercial version is under development.

Factory focus Refractories

Since 1927, Emhart Glass has been developing and manufacturing high quality refractories for the glass container industry.

Emhart Glass understands the basis of superior glass conditioning is high quality refractories, as it is the refractories employed within the Forehearth and Feeder mechanisms which play a crucial role in the formation and conditioning of the glass prior to being formed into Glass containers respectively.

Today, Emhart Glass’s refractory manufacturing operation is located in Owensville, Missouri, USA, and is widely recognized as an industry leader. Owensville employs 49 staff, of whom 33 are in manufacturing. The Owensville plant has been making high-quality...
refractories since it was purchased in 1980 from the Laclede Christy Refractory Company. Laclede Christy had originally been founded in 1844, and built up a strong reputation as a refractory maker. Before becoming a refractory plant in 1976, the plant had specialized in the production of glass pot refractories. Once Emhart Glass had purchased the Owensville plant, the company closed its other refractory operations and concentrated all production in Owensville – a setup that has been maintained to this day.

Our experienced refractory craftsmen, supported by our R&D and engineering professionals, continuously strive to develop and provide the industry’s widest range of refractory glass contact expendables available. For applications demanding customized compositions, Emhart’s unrivalled research and development capabilities enable us to devise the formulations that achieve the specific customer objectives. Our expertise is further enhanced with excellent technical support from the Missouri Science & Technology University located close by.

Of the many refractory expendable mixes employed throughout the glass container industry today, most were originally developed by Emhart and have since become industry standard. Emhart’s refractory compositions are made only from carefully selected high-purity, special-oxide raw materials and range from high alumina, AZS, zircon, and fused silica materials. Our comprehensive range of products offered provide solutions for a wide variety of glass applications, the most popular being 333, 314, 311 and 338 respectively.

Factory focus Container Forming (parts and machines)

Container forming is the heart of our business. Our story began in 1902 when three US entrepreneurs began exploring new ways to make glass containers. The company they formed in 1912, Hartford-Fairmont, developed the first glass-gob shearing and feeding device and the first plunger-feeder – two innovations that paved the way for the automation of glass-container production. Merging with the Empire Machine Company, the firm developed the first IS machines during the 1920s and the first double-gob equipment during the 1930s, changing its name to Emhart Glass in the 1950s.
Today, our many types of machine for glass-container production are developed and produced at our plants in Sundsvall and Örebro (both in Sweden) and Johor Bahru (Malaysia), with repairs carried out in Italy.

Sundsvall covers an area of 24,000 square meters and employs 300 people. It focuses on the assembly and distribution of Hot End equipment, from feeders through to ware transfer. Up to 1000 IS, AIS and NIS sections are produced each year at Sundsvall, which draws on many years’ experience in IS manufacturing dating back to 1952. Assembly of sections into finished machines is carried out here, as well as at our plant in Johor Bahru.

Sundsvall is also the site of our global parts warehouse and logistics centre, where an incredible 18,000 accessories and spares are in stock ready for rapid despatch to clients around the world. During 2010 Sundsvall started operating our S-Class service, which guarantees shipping of 5,000 essential parts within 48 hours. Customers can choose their parts and check availability online, taking the opportunity to significantly reduce the stock of parts they hold.

A Hot End training centre at Sundsvall offers hands-on help with learning how to operate and maintain the full range of Emhart Glass products. Clients can access their training in any one of a dozen languages.

Our other Swedish facility, at Örebro, meets the challenge of making the 20,000 high-quality components that go into each and every machine we make. The fully automated plant includes 40 CNC machines, running 24/7, and is designed using a cell layout that brings together all stages of manufacturing in one location, ensuring rapid throughput and maximum quality. In November 2010, we announced a €2.1m investment into new machining centers for Örebro as the start of a 5-year investment plan.

Johor Bahru is the most recent addition to our manufacturing setup, having been completed in 2009 to replace an existing Malaysian facility. This plant covers a total area of 6,073 square metres, and focuses on the assembly of new IS machines and cross conveyors for customers in Asia and Australasia, plus the fabrication of welded parts. Thirty-four IS machines were assembled since 2007. However, machine sections and mechanisms are still produced at Sundsvall for assembly at Johor Bahru. The plant employs 67 people in total, 25 of whom are in manufacturing.

In addition Emhart Glass offers machine repairs, which are handled in Sundsvall and in a specialized workshop in Italy.
The new BIS is an innovative full servo-electric small IS machine (Fig.1), and was introduced at the last Glasstec in Düsseldorf. This article explains the reasons and driving forces behind this latest development, gives more details of its specification and previews the benefits for potential future BIS users.

As a high performance, extremely flexible IS machine, covering an outstanding ware range, the BIS will outperform today’s small-section IS machines. Mid-term there is a high probability that it will supersede the majority of today’s relatively imprecise pneumatically driven IS machines. Certainly the same will occur as in food packaging equipment, where pneumatically driven mechanical machines have been superseded by servo electric machines.

Current IS Machine Portfolio
Today’s IS machine portfolio was developed over more than 80 years in response to required improvements in performance, quality and flexibility. Everything started with the first commercial 4-section single gob individual section machine installed by Emhart in 1927 at Carr-Lawry Glass, Baltimore. From this modest start, these production requirements have led to the creation of today’s flagship machine, the 12 section servo-electric NIS quadruple gob machine with 48 cavities, an impressive 12 times increase in cavities per machine, together with enormous enhancements in speed, accuracy and reliability.

The evolutionary process is driven by the requirements of the glass container market
for ever greater varieties of container types, sizes, shapes and production runs. These demands are logically reflected in the developing IS machine portfolio structure. Today the industry distinguishes between small section frames and large section frames (See Fig.2).

One of the main reasons for this split is the enormous glass container diversity required by the packaging industry, which is one of the key strengths of glass. Today’s fast moving market challenges the manufacturer to produce containers ranging from a few grams up to over 1500 grams, in production runs covering the range from a few thousand up to millions. When considering investing in a new IS machine, it is extremely difficult to predict which ware will be produced in the short term, and during the whole life of the machine it is virtually impossible.

For large section frames this compulsory flexibility can be typified by the requirement to switch quickly between 6 ¼ DG wine production to a 4 ¼ TG beer production, which is one of the key AIS strengths. The centre distance can be changed within 6 hours. The NIS servo-electric 5” TG machine, which has been available and fine-tuned for 10 years, can be adapted to variations in market demand by changing the centre distance, for example producing 0.75 litre wine in TG (5”) and 0.3 litre beer in QG (95 mm). In other words the AIS and NIS machines can readily adapt to the required production conditions, and thus guarantee the lowest container cost.

The ongoing world-wide IS machine trends are as follows.

**IS 4 ¼ DG**
- Still the machine of preference for small ware, especially cosmetics
- Superseded by 5” DG (mold material) and TG 85 mm availability
- 85 mm TG takes the place of 3” TG

**IS 5” ↔ 85 mm TG ↔ SG**
- Today’s standard small section frame
- 85 mm TG conversion for pharmaceutical and small containers and jars
- SG for very large and heavy containers

**IS 5 ½ and 6 ¼**
- Work-horse for emerging or low-competition markets
- AIS takes over this market

**AIS 6 ¼ DG ↔ 4 ¼ TG**
- The high flexibility, quality and lowest cost of ownership outperforms the 5½ DG and 6¼ DG (4¼ TG)

**NIS 5” TG ↔ 95 mm QG ↔ 6 ¼ DG**
- Highest productivity for high volume markets
A more detailed view of the small section production will give the foundation for the BIS objectives.

**Specific “Small” Section Situation**

A typical small section glass container production highlights the requirements for the BIS concept and objectives. Figure 3 shows a snapshot of a typical small-mid section market place.

- Widely divergent production weights from about 30-700 g, with an average weight of 220 g
- Majority of production runs are relatively short
- Very few long job runs (only 4 runs per year longer than 60 days)
- 4 different machines – SG; 5” DG; 3 5/16 TG; 4 ¼ TG
- Restricted flexibility as difficult to switch production between machines
- Limited production overlap between the machines
- Production runs not on optimal centre distance, 5” DG used for 80-600 g
- Different machines, requiring different mold-gear
- High pull-range changes leading to fluctuating tonnes per day

All of these requirements can be optimally met by a BIS machine.

As a consequence it is clear that to remain competitive, with the ability to produce at the lowest container cost, there is a demand for a production machine with:

- very high production flexibility
- outstanding performance
- excellent quality

There is no doubt that these considerations will also drive the business in the future.
BIS – Breakthrough

The BIS machine combines the best properties from the full servo-electric NIS machine (5” TG ⇔ 95 mm QG ⇔ 6 ¼ DG) and the highest performance pneumatic IS machine, the AIS (6 ¼ DG ⇐ 4 ¾ TG). The BIS is a full servo-electric IS machine simply configurable as a 140 mm DG (5 ½ DG) ⇐ 95 mm TG ⇐ 70 mm QG (⇐ SG) which provides the vital flexibility on small and mid production runs.

The BIS has the following characteristics:

- 21” wide section frame
- Servo-electric full parallel blank and blow mold open and close mechanisms
- Servo baffle mechanism enabling the use of the unique V-Baffle
- Servo Invert/ Revert
- Neckring with individual left/right controlled pneumatic opening
- Servo Blowhead (identical with Baffle mechanism)
- Servo Take Out
- 12 individual on/off cooling controls (prerequisite for closed loops)

The BIS concept specifies a shorter job change time, by reducing the time to change the machine centre distance (140 mm DG ⇐ 95 mm TG ⇐ 70 mm QG ⇐ SG) in addition to the process change (NNPB ⇐ PB ⇐ B&B), with the outcome of higher performance.

The impressively huge BIS ware range covers the complete small and mid sized ware container production. In the case of the typical production situation described above, the BIS covers the complete production requirements, and can replace the 4 different types of machines. It is readily adaptable to market requirements, with a large overlap within the different centre distance configurations, in the same way as the NIS (Beer QG – Wine TG) or AIS (Beer TG – Wine DG).

This fusion of all the best features and Emhart experiences from the NIS and AIS into the BIS (Fig.4), small and mid ware servo-electric IS machine will make a major difference. The BIS machine is optimised for fast job changes and centre distance changes, and has the potential to replace today’s 4 ¼ DG, 3” TG, 5” DG, and 85 mm TG as well as SG machines by superior performance, higher flexibility and better quality.
A fruitful partnership: the story behind the FlexPusher SP

Around five years ago, Emhart Glass introduced the FlexPusher, to great success and industry acclaim. Since then, more than 2,000 FlexPusher units have been installed, and are now sweeping glass containers onto our customers’ conveyors quickly and accurately, much to the satisfaction of everyone involved. FlexPusher made it possible for quadruple-gob NIS machines with up to 48 cavities to produce up to 800 bottles per minute. In fact, its performance is so superior that pneumatic pushers have already started to disappear from the scene.

Analyzing the issue

About two years ago, an Emhart Glass customer installed a 12-section triple-gob AIS machine for producing non-round 180ml brandy flasks at high speed. Sadly, ware-handling difficulties surfaced soon after startup: as is often the case, it proved difficult to get the non-round flasks at the correct angle to the conveyor belt. An Emhart Glass service engineer analyzed the issue on site in partnership with the customer. He then designed a new type of FlexPusher finger that would place the flasks at an angle of 45°. This improved performance considerably, but the new finger design featured many different parts, which led to issues with wear and maintenance.

Fig.1 (left) FlexPusher movement
Fig.2 (right) FlexPusher SP movement
Consequently the service engineer reconsidered the design in partnership with a mechanical engineer and the Emhart Glass R&D team. Together, they concluded that a solid one-piece aluminium finger would overcome the maintenance issue – and improve performance too. A prototype was tested at the Emhart Glass ware-handling labs with promising results. During the next visit to the client, the new finger design was installed and tested. The lab results were replicated in the factory, allowing the customer to speed up a difficult production process – a major step forward.

**Best in class comparison**

The two ‘best in class’ pushers currently on the market differ in two ways: the complexity of the mechanism and the means to adapting the motion profile to different ware. FlexPusher’s nearest rival is more complicated, with a three-axis servo – which also makes it more expensive. In terms of adjustment, FlexPusher’s interface lets the operator set key parameters as needed, adapting the pusher to everything from single-gob to quadruple-gob production of containers in any size. FlexPusher is also compatible with the full range of Emhart Glass machines, from SIS to NIS. In contrast, its nearest rival has fixed cam profiles. The two pushers offered equal performance on the difficult non-round-container task. But the new aluminium finger made the difference, boosting performance – even when attached to the rival pusher.

**Reduced radius, improved performance**

Based on this success, Emhart Glass product managers and engineers felt they could improve performance even further to cope with higher cavity rates. Following design studies and simulations, they decided to reduce the radius of the FlexPusher arm, allowing a totally different motion profile. Prototype tests in the Emhart Glass ware-handling lab soon confirmed the expected benefits and superior performance. For non-round flasks, the new profile delivers improved collection from the dead plate, executing a full rotation so that three flasks are pushed on to the conveyor completely parallel to one another, accurately hitting the available ‘window’ of space. Software parameters were also adapted to integrate these new capabilities into the interface.

**Proven in the field**

Following a live demonstration at Emhart Glass Sweden (Fig. 3+4), the customer who had faced problems with non-round flasks decided to upgrade their complete 12-section triple-gob machine with the new short-radius FlexPusher SP. The upgrade was duly carried out on site, with the conveyor moved 25mm further out to allow space for the new movement. After a few motion-profile adjustments, the short-arm FlexPusher SP proved itself capable of handling non-round flasks just as easily as standard round bottles. The customer was so delighted that they ordered short-radius FlexPushers SP for twelve new machines to be installed in greenfield developments and plant extensions. For their part, Emhart Glass used the experience to develop a valuable portfolio extension: a high-performing pusher for high-speed applications where full ware-range flexibility is not required. This truly was a fruitful partnership! •
IS machines have served the glass-container industry well. Originally developed by Emhart Glass, IS technology has been in use for over 80 years, and it’s still going strong. However, those eight decades have seen continuous change and modernizations to improve efficiency, flexibility and quality.

Control systems are critical to reliability and precision, and have been the focus for some of the most dramatic leaps in technology at Emhart Glass. During the 1980s, we created the T600 control, which became the industry standard for 25 years. Many units are still in use. In 2004, we introduced FlexIS, the first fully integrated control system that could oversee the glass-container forming process from the feeder to the stacker. Since then, almost 400 complete systems and 120 standalones have been installed. As a consequence of this success, the T600 control system became obsolete in 2006, with a guaranteed supply of spare parts until 2016.

Birth of TS-E

Our latest control innovations offer new levels of integration, usability and modular expansion. In 2010, customers began to ask whether FlexIS could be expanded to encompass a FlexPressure System (FPS), FlexPusher, Servo Takeout (SETO) or Servo Invert (SEI). In response, we restructured FlexIS to create the fully integrated FlexIS TS-E (Timing System Expandable) control system.

TS-E uses the same components as before, but unifies the section, machine and ware-handling controllers into a single system. Its simple, three-module configuration helps to keep spare-parts costs to a minimum. The system is capable of controlling both pneumatic and servo-electric devices, and can also mix analogue and servo valves within the same event.
TS-E can control a maximum of 12 sections, or as many as 24 in tandem configuration. All the existing drive components can be retained, as can the gearbox. TS-E is now fitted as standard on new IS and AIS machines, and a special version with a larger cabinet is included with NIS machines.

Cabinets and controls

TS-E is housed in two different cabinet types: one type for the section controller, and one for the machine controller and ware-handling controller. The new cabinet design allows for simple step-by-step expansion with FPS, FlexPusher, SETO and SEI, as our customers have requested. TS-E is the first control system to integrate FPS control within the section control.

One section controller cabinet manages the section timing for four sections. Up to four servo drives can be added in order to support FlexPusher, SEI, SETO and other additional functions. Communication and synchronization are achieved via TCP/IP over Ethernet, which allows for remote access and control via the internet, if required. The system also includes a CAN open bus connection for configuring devices.

Moving across to the other cabinet, the machine controller drives the five gob-forming servo motors, ensuring precise and controlled motions for tube rotation, tube height, feeder plunger, shear and gob distributor. The ware-handling controller (WHC) manages the various servo motors involved in smooth container handling: conveyor, ware transfer, cross-conveyor and stacker. In addition the ware-handling controller can control the conveyor height. The optional Ware Handling Supervision (WHS) operates as stuck- and down-ware reject. The Pressure Control Unit (PCU) is also optional, and manages in a closed loop up to 12 compressed air lines of an IS machine forming process.

Human interface

The best technology is nothing without effective control. On TS-E, operators use a human-machine interface (HMI) comprising the Universal Console (UC), the Hand Held Terminal (HHT), blankside panel, blow-side panel, feeder operator station and ware-handling control operator station. The UC runs on a standard Windows PC with a touch screen, housed in an air-conditioned cabinet. The FlexIS software features ergonomic pull-down menus for rapid navigation, with which operators can quickly set the desired parameters or import/export job files. The software also provides alarms in the event of problems, together with reports on status, production and downtime. Servo axis parameters are represented with intuitive graphical visualizations, showing both theoretical and real curves. UC supports a multi-language database, so operators around the world can use it in their first language.
The Hand Held Terminal gives an operator near the IS machine instant access to the key functions covered by the UC – viewing and changing setup parameters, viewing input status, activating mechanisms and troubleshooting.

The blank-side panel is located overhead on the blank side of the section, while the blow-side panel is located on the conveyor in front of each section. These two panels feature switches and buttons with functionality clearly indicated with pictograms. Operators can override or disable each mechanism individually, to allow manual operation, initiate an automatic calibration cycle for all the section’s servo-mechanisms or activate special cycles including cold blank/blow cycle, manual swab, delivery request, normal stop and blow-side special cycle.

The feeder operator station provides an interface for all the feeder’s servo-mechanisms: feeder, tube, shear and gob distributor. The user can optimize settings for the gob-forming axis and gob delivery. Finally, the ware-handling control operator station facilitates management of all ware-handling servo-motors.

**Standalone control systems**

Not every customer is in a position to replace their entire control system at a stroke; others may wish to integrate systems from different manufacturers. To support this, Emhart Glass’ control systems are also available as standalone systems. As well as being integrated with TS-E, the servo-electric in-vert (SEI) control system is now available as a standalone, complementing the FlexPusher and Servo Takeout (SETO) modules that are already available. Now any standalone configuration can be realized, including pusher (860 or FlexPusher), SEI and SETO, on lines with six to twelve sections.

Standalone systems are controlled via an LCD touch screen with function keys. Connectivity is via an Ethernet interface. Each mechanism has its own local-disable switch, and there is also an overall E-stop. In the full configuration, to control two or three mechanisms, standalone controls feature a main cabinet for FlexPusher controls and an extension for the SETO and SEI drives. If controls for just one servo-mechanism are required, only the main cabinet with the requested axis is used.

Now, we are looking forward to helping clients old and new to make a truly future-proof investment in state-of-the-art glass manufacturing controls. The current Emhart Glass controls portfolio covers all customer needs for a flexible, scalable, best-fit control system allowing seamless and straightforward future expansion.
Who, What and When?

Three simple words when used in this order can be so important.

With the introduction of the SmartKey security system that is a standard part of the FleXinspect product line, Emhart Glass is providing a new level of traceability for glass plants around the world. The SmartKey device is a programmed dongle attached to a key fob that machine operators use to access the FleXinspect inspection machines. This device can be programmed to a number of security levels. Different security levels create customized menus within the software from the very basic, to full access navigation. Controlling the level of access which operators are given, helps ensure that only qualified people who have the authorization to make changes can get to the menus and parameters that could affect the machines performance.

For people in a glass plant, daily routines revolve around the checking and validating of equipment and products. Everything gets inspected, everything gets checked, then rechecked; it is a never ending cycle. These checks and rechecks are performed with a common goal; Quality. From products being shipped to the customers, to the machines that ensure the ware is good, everything is checked. Every time something is checked, the task is documented. It can be as simple as someone’s initials on a piece of paper, or entering data into a computer. The idea behind the documentation is traceability. The importance of knowing “when” something happened can save plants unexpected costs in reselect and rework by helping them to know when control was lost. Knowing “what” happened helps ensure that corrective actions can be taken to help prevent a problem from reoccurring. And knowing “who” allows the plant to correct the situation through training or other means.

Emhart Glass understands the importance of traceability when it comes to the inspection machines you use. Machines get set up to perform inspections at a certain level of quality. During production runs, they are checked, rechecked, and then checked again at some frequency to ensure they are reliably inspecting at the same level that they were originally setup.

When an operator walks up to a machine and introduces his or her SmartKey, it automatically logs the name of that person (Who). Changes are made during the session are automatically logged, including the parameters modified (What). These log files can then be used to see at what time these changes were made (When).

The introduction and use of the SmartKey in the FleXinspect family is a big step forward in helping you maintain your records. The electronic logs that are created when using this device tell the whole story. You now have the ability to know who made the change, what the change was, and when the change was made.
With the introduction of the FleXinspect BC, the newest vision based machine to inspect and control the finish, base, and sidewall of glass containers, Emhart Glass is working on ways to reinvent how operators use today’s vision equipment. Together with a new look and feel to the graphical user interface, Emhart Glass is also introducing powerful new features, such as an “easy” mode, and intuitive inspection setup wizards.

Imagine what it is like for the technicians who are responsible for the operation and maintenance all of the cold end equipment in today’s glass plants. Training always seems to be an issue; a day here, a day there, many times only a small number of individuals get the in-depth training required to fully understand how the equipment operates before it gets placed into production. For the remainder of the staff, individuals who may never have had the full training course, or just didn’t catch on as fast as everyone else? They have a problem. What happens when they find themselves standing in front of a machine that may be taking up to 30 images of a glass container and they need to figure out how to correct a situation. The situation may be simple; maybe the machine is not detecting one of the samples reliably. Or worse, maybe a new sample needs to be setup. Where do they start?

This is a real life scenario that many cold end maintenance personnel face in their daily routines. How much does one person need to know? How can everyone on your staff be an expert at everything? With the daily main-
maintenance activities and the sheer number of machines for which the maintenance staff is responsible, it is not surprising why many are reluctant to learn a new machine. As a solution provider, it is very troubling for us when we install a state of the art machine and discover that personnel in the plant may be reluctant to learn how to use it. This can be even more troubling for the plant managers who have invested in new technology.

Emhart Glass is working hard to prevent this from happening, but it is not a small task. Today’s inspection machines are equipped with numerous computers communicating among themselves on internal networks. Cameras and lights are mounted everywhere, creating views of the containers that some operators may have never even seen before. And everything needs to be right for it all to work. For us at Emhart Glass, that part is under our control, but what about the inspection quality limits? Inspection setups and sensitivities are, and have been, determined by our customers. However, this is the area where Emhart Glass sees the greatest opportunity for our experts to help your operators. Our engineers know what the tools are designed to do and how they work. They know what edge detection and blob discrimination mean. They also know when these inspection tools need to be applied. With the introduction of an “easy” mode and setup wizards, the task of setting up inspections and quality limits in the FleXinspect BC can get a lot easier.

Why, after all of these years, has Emhart Glass decided to take a new approach at helping you control your quality levels? The answer is obvious; today’s technology simply moves too fast. We need our customers to be successful with the new machinery. And as the solution provider, it is our responsibility to provide the tools you need to meet your customers’ demands. The days of inspecting containers with a single image are in the past. In today’s world you need to set up on several groups of images that are optimized to find a wide range of defects. We find that without a real understanding of how it all works, operators may get intimidated and start to avoid the new technology. The more you need to do, the more you need to know, the higher the probability something might be forgotten or set incorrectly. Emhart Glass recognizes this problem is very serious, and realizes that we are the ones who can help prevent it.

What if the setup was as simple as running a sample bottle through the machine, pointing to the feature of interest and telling the machine to “pass” or “fail” this feature? What if, you could tell the machine to be “more sensitive” or “less sensitive” on this feature? What about “bigger,” “smaller,” “lighter,” “darker”?

Emhart Glass has some good news! Today’s technology is allowing us to turn these “what ifs” into real innovations. Our goal is to provide a new machine human interface incorporated into the FleXinspect BC, that will make features like the new easy mode a reality. Once released, setting up the machine to detect your defect samples will be as easy as a few taps on the screen.

This is just the starting point, but by harnessing the power of today’s computers and automating the inspection setups, we are doing our best to ensure that anyone (with the right security level) will be able to tune the machine to meet the plant’s quality requirements.
Hot End Measurement System

(Fig.1) Graphical display of the measured wall thickness at a specific container height.

(Fig.2) Graphical display of the container finish with threads.
Emhart Glass introduces the new Hot End Measurement System to the market and creates additional process control opportunities for glass container manufacturers.

Glass container manufactures know, all too well, the task of hand measuring containers with go / no-go gages in the Hot End. This new Hot End Measurement System provides fast, accurate, semi-automated dimensional measurements for a wide range of glass containers in the Hot End, helping to eliminate the time delay of the annealing lehr and waiting for dimensional feedback from the Cold End. In doing so, this system improves the glass making process and reduces the costs associated with annealing time losses.

It is designed for the glass container industry, specifically to measure all contour dimensions including the finish area, internal bore diameters and the glass thickness.

Now glass container manufactures can install this Hot End Measurement System in the Hot End and collect dimensional measurement data such as container lean, ovality and glass thickness, reducing container dimensional feedback time delay of the annealing lehr.

Providing the container measurement data at the Hot End is a major breakthrough for increasing productivity, profits and keeping the process of glass making under control. This Hot End Measurement System not only provides immediate dimensional feedback, but also comes standard with its own data analysis software and onboard database storage, to save and view historical data.

It was also successfully exhibited at Glasstec 2010 in Düsseldorf, Germany where it raised great interest within the glass container industry. Glasstec visitors could conceive the amount of important informational feedback that this Hot End Measurement System provides. Visitors also commented on the sleek, compact, modern, yet robust design.

Important features of this system include an intuitive operator interface that ensures the measurement system is easy for all to use, an automatic container centering device, and the ability to accurately measure glass wall thickness and bore dimensions using non-contact technology. In addition, this Hot End Measurement System introduces an innovative invisible safety barrier that adds great value to the machine’s functionality which creates a clean, safe and open work space.

Its “Cavity Jog” feature automatically moves the selected bottle location to the next position on the operator screen. The operator places subsequent containers onto the turntable and presses the start button. When measurements fall outside the pre-determined warning limits, the associated cavity icon changes to red (outside of alarm limits). Measurements within specification change the cavity icon to green. When an operator requires more information, they simply select the cavity icon and the data of the current container is automatically shown along with the preceding bottles.

Live on screen graphical representation of each dimensional measurement is displayed and provides a real time feel as to how your manufacturing process is performing.

Figure 1 shows the numerical results on the right-hand side of the overview screen, whereas the graphical data is clearly presented on the left-hand side. This particular example displays the variation in glass thickness over the 360º axis of the chosen container at a specific height.

This second example (Figure 2) graphically displays the thread region of the container. Throughout the various software screens the user can zoom into the data and pan around the screen with ease. Although this feature isn’t necessary for the basic operator, it meets and perhaps exceeds the “New-Age” of today’s glass specialist’s analytical requirements within the science of forming containers.

Emhart Glass will also include this new Hot End Measurement System within the Statistical Sampling and LAB Measurement product portfolio. To learn more about Emhart Glass Products contact your Emhart Glass representative. Hot End measurements - providing the future with informational feedback!
When Emhart Glass first developed the IS machine in the 1920’s, only a few materials like cast iron, steel and bronze were available to the engineers of the time. Despite this restriction, they achieved machine performances which revolutionised the container glass industry.

This revolution continues today, and Emhart Glass is continually examining new materials with the potential to further increase the performance of glass-making equipment, through greater wear resistance, reduced weight or higher chemical resistance. Not all of these investigations lead to the launch of new products – besides physically improvements, a new material must also demonstrate greater profitability to the machine owner. Sometimes new materials involve more expensive production methods, or a modification in plant operating procedures which not all plants are able to achieve. Nonetheless, Emhart Glass continues its research into new materials with the promise of user benefits. Three examples which apply to virtually all machines – not only those manufactured by Emhart Glass:
Shear blades
Shear blades are traditionally made from tool steel, and formed through stamping, selective hardening and grinding. Additional performance may be achieved through coating the blade with proprietary materials, and by varying the blade shape and cutting profile. For decades such steel blades were – and still are – the main instrument for gob-cutting. They are attractive to the plant, being relatively inexpensive (despite the demanding tolerances), but at the same time offering a reasonable operating life and general freedom from shear marks.

A few years ago Emhart Glass launched the alternative to steel, namely Tungsten Carbide. The production method is far more demanding than for steel, and is mastered by only a few producers worldwide. In addition, production times are longer, and tolerances are much more difficult to maintain. The benefits of Tungsten Carbide are its extreme resistance to wear, chemical stability, stiffness (which may also be a disadvantage if not used correctly), and precision cutting ability which further reduces the risk of shear marks.

The search for new shear blade materials continues into the realm of ceramics. In many ways, this group of materials takes both the advantages and disadvantages of Tungsten Carbide to extremes. These blades hold the promise of being lighter, stronger and harder, but more brittle and more expensive. Emhart Glass has not yet committed to this material, but is closely watching developments in the area.

Pusher-finger liners and takeout inserts
These small wear parts are used in large quantities by all plants, irrespective of the type of equipment operated, or the process used, or the ware-type produced. Traditionally they are produced from a carbon composite, which offers reasonable resistance to mechanical wear and thermally-induced deterioration.

A recent development introduced by Emhart Glass is the material Vespel®, which offers a significantly longer life due to higher ductility and chemical resistance. A slight drawback is the longer time needed to manufacture the liners and inserts, but this is more than compensated for by the lower cost, which Emhart Glass is able to pass on to its customers. Savings of up to 50% are possible, plus the longer operating life.

Scoops
Traditionally scoops have been manufactured from iron or aluminium. The use of iron has virtually died out, but aluminium is still widely in use, due to its light weight and workability. However this material suffers from two main disadvantages – its low resistance to wear, and its susceptibility to chemical erosion during washing, particularly within the cooling channels. The wear resistance can be greatly improved by the application of various proprietary coatings, and today Emhart Glass offers a full range of coated-aluminium scoops which offer excellent wear characteristics at a reasonable price.

Recent years have seen the rise of Stainless Steel for manufacturing scoops, and other elements of the delivery system. This material is three times as heavy as aluminium and more difficult to work, but offers a high wear resistance together with an excellent chemical stability. The scoop portfolio of Emhart Glass includes stainless steel scoops in the most common sizes.

A further potential scoop material under investigation is titanium. The higher material cost is balanced to some extent by its relative lightness (about half that of stainless steel) combined with good chemical resistance. Again, Emhart Glass is keenly watching developments in order to quantify the material’s benefits to customers.

Conclusion
New materials for parts can offer great potential for more efficient bottle-making, but each advance needs to be carefully assessed from all aspects before being brought to the market. This is a fascinating process which will probably continue for many years to come.
In the modern world of advanced IT systems and internet, access to information has become much quicker and the data much more detailed. We at Emhart Glass offer a wide range of information on our website. In the area of Parts Services we provide information about our S-Class program, together with our maintenance and repair Kits as well as the refractory catalogue and accessory selection guide.

S-Class parts are those parts which can be shipped within 48 hours from stock for Inspection Machines and Hot End Equipment, and within 8 days for our Refractories. The S-Class online guides enable searches to be made for specified parts, and analysis of specific assemblies to indicate which of the components are S-Class parts. This allows the customer to optimize his inventory and ordering strategies. The Kits search engines provides information about the content of all our Hot End equipment maintenance and repair kits. Using the same product portfolio navigation structure as in the S-Class search engine, customers can find the detailed contents of all Kits which we supply for our mechanisms and assemblies. As in the S-Class engine, it is also possible to search backwards to determine in which mechanism or assembly specified individual parts are contained. In the refractory catalogue as well in the accessory selection it is possible to find correct part numbers for these variables, based on equipment configuration. Our local sales personnel will be happy to assist with any further details, and to supply quotations as required.
Emhart Glass offers the most comprehensive product portfolio of all suppliers to the glass container industry, but this service does not stop with the delivery of the equipment. The aggressive environment and 24-hour operations encountered in glass container production inevitably lead to equipment wear, and this in turn creates a demand for maintenance, which can include repair of components, mechanisms and the entire machine after a certain time in operation. This requires the customers’ installed equipment around the world to be supported with a variety of services. The repair services provided through Emhart Glass locations are a key element in assisting customers to continuously maintain the low operating costs which are achievable with our equipment. Emhart Glass offers a complete range of repair services which go far beyond just supplying spare parts and repair kits. The portfolio of repair services can be split into two areas.

On-site repairs

The on-site repairs service supports the customer with major repairs activities, which include section exchanges and major overhaul of mechanisms. The Emhart Glass field sales organization is the main contact for the customer to initiate these types of projects. Specialists of our Customer Service organization can conduct mechanical and electrical audits to specify recommended repairs. A project manager for the on-site repair ensures all activities are well prepared and coordinated with the customer, our manufacturing sources and our Customer Service specialists. Currently, the most popular on-site repairs are section exchanges.
**Emhart Glass in-house repairs**

The in-house repair service provided by the Emhart Glass manufacturing units covers a wide range of our products, from individual valves and motors up to complete gob forming mechanisms. The repair process employed depends on the type of part or mechanism to be repaired. For certain parts and mechanisms, we offer individual repairs of the customer’s own items in our facilities, whereas for other parts a pool exchange system is a more efficient solution.

The pool solution means the customer returns his item to be repaired, and in exchange he receives immediately a repaired part from the pool. Emhart Glass offers repair services covering shear mechanisms, gob distributors, sections mechanisms, and components like motors, valves, electronic elements for our control system T600 and T6000 families as well as FlexIS and the PPC system.

All of our repair services exclusively utilize original Emhart Glass parts, assembled by experienced manufacturing personnel, and are accompanied by a 12-month warranty on all repaired items. To order an Emhart Glass in-house repair, please contact your usual Emhart Glass sales office, who will issue a quote, and advise on the procedure for returning the equipment to the manufacturing plant.

Of course, some equipment cannot be practically and safely repaired on technical grounds – for example damaged cables. In other cases, the resources required to disassemble, clean, assess, repair, re-assemble and test the equipment are out of proportion to the cost of a new item. However, for many items of equipment an Emhart Glass in-house repair can prove to be a cost-efficient method of keeping the glass production running at its optimum performance.
Update: FlexIS Remote Service

FlexIS Remote Service is a service offered by Emhart Glass to its customers worldwide. As the name suggests, it allows an Emhart Glass specialist to log into the FlexIS control remotely, in order to solve problems and propose improvements, without the need for a traditional visit to the customer’s plant.

FlexIS Remote Service was launched at Glasstec and has since proven its value numerous times. Many questions and issues could be resolved remotely by our FlexIS Remote Service experts, saving our customers substantial time and cost.

FlexIS Remote Service is a structured service package offering several benefits:

> **Link**: experience with remote service has showed that too often the remote connection is not available when it is needed most. Typical reasons are e.g. changed numbers, changed addresses and disconnected lines. Link is an automatic connection check which ensures that the remote connection is always available.

> **Expert Network**: the FlexIS Remote Service specialists have access to an organized expert network of additional remote service and R&D specialists within the entire Emhart Glass organization.

> **Diagnosis**: Emhart Glass has developed special Remote Service software tools to analyze log data files. It is possible to analyze machine alarm history, machine state history and operator panel history. This helps to identify, for example, if a reported issue is a machine issue or an operator error.

> **Resolving Issues**: the FlexIS Remote Service specialist can correct machine and job setups in close cooperation with you. He can also thoroughly prepare a subsequent on-site service trip by determining required parts.

> **Consulting**: how exactly did that rarely used special configuration work? FlexIS Remote Service is happy to answer your questions. Ask the expert and save time.

> **Reports**: All FlexIS Remote Service activities are logged. For each Remote Service intervention a service report is compiled and sent to you.

FlexIS Remote Service comes with a comprehensive safety and security concept. Based on the experiences from the pilot phase we are continually fine-tuning the service and we are happy to offer this service soon with all machine projects.

Please contact your usual Emhart Glass representative to learn more about the advantages and cost-saving possibilities FlexIS Remote Service can offer to you.
The new Emhart Glass mold design engineering training, introduced in early 2010, has already helped many customers to improve their know-how in mold design. Based on customer feedback, the course is a real success, helping glass plants engineers to better understand the principles of mold design and bottle making.

Producing glass containers is a continuous process of improvement and learning, in which mold design is one of the major key factors in order to achieve best machine performance and good production efficiency. More and more we see glass plants which neglect mold design, and prefer to outsource the design of containers and molds to some random third party companies with no experience in producing glass containers. There are substantial benefits for a glass plant to invest in a mold design department, focused on the daily production, and working with the production department on the continuous improvement of the IS process. We firmly believe that a strong, skilled mold design department is essential to reach high efficiency production runs, and to ensure a high-performance glass plant.

One year ago, Emhart Glass launched the new premium mold design engineering training course for the container glass industry. This five-day course is dedicated to mold designers and production specialists, and is divided into two parts: theory and practice.

The theoretical part covers mold design interface, blank and blow mold cooling (Verti-Flow versus InVertiFlow), parison design (for B&B, WMP&B, NNP&B, LWB&B) and container requirements. The practical part is focused on exercises centered on customers’ own containers and production issues.

The Mold Design training course was for me as production specialist particularly interesting and useful. Several topics were discussed, including:

- Design limits and parison design for BB, PB and NNPB under a variety of cooling conditions
- Functions and tasks belonging to mold design
- Requirements / demands on a glass container
- Problem-solving

It was a good idea to hold this training course in conjunction with the experienced designers within the Vetropack Group. Repeatedly we had really detailed discussions which were very useful for everyone involved.

We could not cover everything within 5 days, and for this reason I think it would be a good idea to repeat the course with the same participants, focusing this time on solving specific problems. Of course, it was particularly beneficial that the group consisted of both Production and Design specialists, which allowed the experiences and problems of both departments to be considered during the discussions.

Peter Tenta (Performance Manager)
Vetroconsult AG – Vetropack Gruppe
In the past year, more than 100 participants from different countries (Switzerland, Austria, Croatia, Czech Republic, Germany, Sweden, Thailand, Malaysia, India, Brazil, Mexico, USA, Chile, Egypt, Iran, Turkey ...) have taken part in the training course at various locations. The courses were held both at Emhart Glass’s own facilities and on customer’s sites. Training courses held on customer’s site were particularly appreciated by customers, since they were fully customer-specific and customized to the individual client’s needs: in that sense, training courses organized for several glass plants belonging to the same glass group were especially constructive, since more open discussions could take place.

Common discussions and exercises are mainly focused on improving container glass thickness distributions, on light-weighting projects (NNP&B and LWB&B), on parison designs using the forming simulation tool, and on the understanding of the VertiFlow/InVertiFlow cooling process.

Conclusion

The Emhart Glass mold design engineering training course is an excellent investment towards strengthening the technical staff of your glass plant, where it can result in increased machine efficiencies, improved container quality and finally in a better performing glass plant.

If you are interested in this training please contact us at: hotendtraining@emhartglass.com

Training schedules can be found at: www.emhartglass.com
2010 World Glass Container Industry – a Regional Review

Glass offers undeniable advantages over other packaging materials: 100% product integrity, extraordinary shelf life, close-loop recyclability, cost-effective refillability and last but not least, it provides the glossy, classy and glassy touch that adds value to a brand. This is why brand owners choose glass. Thus, glass is well positioned in the high-end, high margin segments, mostly as a one-way container, especially in developed economies. On the other hand, in developing economies, glass is well positioned to allow brand owners to reach the low-mid income classes, as the most cost-effective pack format in returnable glass.

Packaging consumption follows economic growth. Therefore, our industry finds itself still recovering from the 2008/2009 financial crisis at different degrees by region and countries. In 2009 the world GDP contracted by 0.6%, with the highest repercussion in developed economies that represent 41% of the world glass container production. Emerging economies demonstrated more resilience and recuperated much faster, being driven by Asia, in particular by China and India, the engines of world economic growth in 2010. Overall in 2010 world glass container production rebounded to reach ~66 million tons, (see graph above), representing growth of +3.2% (2009: -3.6%), strongly driven by volume growth in China. The regions performed as follow:

### Advanced Markets

The saturated glass markets in West Europe, North America and Japan (41% of world production) grew by only 1.3% in 2010, attributable to a continued limited consumption of premium goods, wine and beer as a result of restricted disposable income. So far, the outlook to 2015 indicates that West Europe¹ and North America are likely to experience limited growth in beer consumption, maximum 0.5%/year. Nonetheless, there are signs that economies are improving. In Germany production rates are rising. Moreover, rising exports to China and other emerging markets of wine, spirits, pharmaceuticals and luxury
goods like perfume and cosmetics are spurring the demand for glass. The US presented a similar situation for the glass industry. The economic downturn affected beer consumption. However, glass has seen support from the wine industry (Washington, California) as it continues to grow due to exports.

In advanced markets the trend towards sustainable packaging will persist. Light-weighting is high on the agendas of brand owners, not only for marketing but economic reasons. Glass plants must respond - as they do - with a variety of light-weighted and/or high recycled-content containers.

In Eastern Europe growth contracted 1.4% in 2010. In the CIS, especially Russia, many glass plants went out of business during the recession. The situation has only now started to improve. Recent oil price increases provide a welcome relief as this will propel consumption. Glass container demand is driven by vodka, beer, and also food consumption. Vodka is the shining star for glass due to its popularity in the spirits world. On the other hand, beer is a nascent market, with a high share in PET in the mass-market, and glass in the profitable high-end market. Yet, a recent tax intended to counteract excessive drinking affected beer consumption. However, this step proved positive for glass since vodka consumption rose instead by 5.6% in 2010. Other East European countries (i.e. Czech Rep., Poland) with still low per capita glass consumption are moving to emulate Western consumption patterns fostered by an increasing presence of international retailers. We are seeing an increasing demand of glass for domestic and export use.

**Emerging Markets**

Latin America (11% of world production) grew 1.2%, driven by Brazil which is showing strong economic growth, driving consumption and additional investment. International brewers are expanding in the region since beer consumption is expected to grow 3% p.a. to 2015. In the Southern Cone the demand for Chilean and Argentinean wines is calling for increasing investment in glass container production.

As to Asia-Pacific (28% of world production) glass container production grew 7.9% in 2010. Growth is strongly driven by emerging economies in the region. Consumption of consumer goods is increasing as disposable income rises. Brewers looking to replace stagnating beer markets in developed regions have moved to acquiring local brewers in China, Vietnam and India. Beer consumption in China is expected to grow 6% to 10% annually and to account for more than one quarter of world beer consumption by 2013. In India beer sales grew 11% in the year to March 2010. Today, Indian per capita consumption is 1.2 litre p.a. versus the global average of 22 litres p.a. (50 litres in developed markets). Moreover, according to IWSR, India and China are considered the fastest growing markets for spirits. India will overtake Russia to become the 2nd largest spirits market globally in 2013. Also, the pharmaceutical industry has bright prospects in the region.

The Middle East (4% of world glass container production) grew 6.9% in 2010 from a low base. The export situation stabilized after the crisis. Production (tons) is composed of 56% in beverages, 29% in food and 15% in perfumery, cosmetics and pharmaceuticals. Expansions are being planned again to respond to food and pharmaceutical packaging demands that will enjoy double digit growth. Spirits consumption is limited; nevertheless, local glass plants export to meet long-term contracts with major spirits companies outside the region.

Africa represents 2.9% of world production and in 2010 grew 11.4% from a low base. Several Central African countries, rich in natural resources, are enjoying better economic prospects thanks to China’s investment in the region. Between 2000-2009 beer consumption has risen by 50% to 95 million hl, with per capita consumption still less than 10 litres p.a. Beer consumption will grow by 5% p.a. until 2015. Beer has become more affordable to larger segments of the population and many can afford to trade up to premium brands. Major brewers see the potential and are fighting for the dominant position in key markets. As a result of improved economic perspectives glass container demand is rising now not only in Nigeria, but also in Angola, Mozambique, and Kenya.

In emerging markets the returnable container is still very popular. However, as economies grow so will the premium segment grow, to the point where the share of one-way containers starts to rise.

In conclusion, we may say that there is a shift in glass container production taking place towards emerging markets, determined by economic growth. Advanced markets will benefit from a rising demand for export goods for wine, spirits and perfume/cosmetics to growing economies. In these markets domestic glass container demand will rise in line with the region’s economic perspectives.

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1 Brauwelt International: “Seeing is believing – beer consumption forecasts” Volume 2010
2 International Wine & Spirits Drinks Record
In October 2010 the European Container Glass Federation FEVE launched their new communications campaign, NOTHING. This campaign fits in seamlessly with the still-ongoing “Friends of Glass” initiative. The main focus of NOTHING is to educate consumers in synthetic chemical leaching from glass containers. As the name already says, there is literally NOTHING.

To highlight this fact, FEVE came up with an ingenious, innovative event: A mineral water tasting. This taste-bud stimulating, interactive presentation was co-hosted by Members of the European Parliament and run by Andreas Larsson, Best Sommelier of the World 2007. According to the prize-decorated sommelier mineral water is an equally complex beverage as wine, and different sources will have very distinct tastes. These delicate differences are only distinguishable in the absence of any packaging-related influences – therefore glass that leaches NOTHING is the only packaging of choice that will protect and preserve the water's inherent taste qualities.

So far FEVE’s NOTHING campaign has been very successful. One measure of this success is certainly also that the competitive plastics industry has noticed the efforts undertaken by the European container glass industry. In a recent editorial, appearing in European Plastics News (November 2010), the author laments that apparently “consumers can be won over, not by science but by simple to understand claims that tug at the emotions.” He further writes that the plastics industry will have difficulties to come up with similar slogans of “pure” and “made from natural elements”, like they are being used in the current NOTHING campaign.

Leaching of synthetic chemicals and the effect this has on human (and environmental) health are truly the plastics industry’s Achilles
heel. Plastics are always complex mixtures of many different chemicals, and the composition of this mixture will vary with the different additives that are used to make plastics, raw material batch quality (impurities), physical manufacturing conditions and even manufacturing location. Identification of each and every single component is technically and economically not feasible. This means that plastics in contact with food can always leach unknown, untested chemicals that may or may not affect health – one simply does not know. Besides this risk of the unknown there are in fact many tangible known health hazards linked to plastics, the most prominent and best researched of course being the hormone-active bisphenol A, or BPA.

This basic building block chemical is the main component of polycarbonate baby bottles. A popular plastic especially for applications where sterility is of high importance (polycarbonate can easily be autoclaved), polycarbonate has been used for almost 3 decades now as the unbreakable replacement of glass feeding bottles. This era is now coming to an end: Canada and Europe both have banned polycarbonate baby bottles, and several US states have passed such laws. In China the Ministry of Health has announced similar steps. But does this really mean a “renaissance” of the glass baby bottle?

Increasingly retailers are selling plastic baby bottles labeled as “BPA-free”, hence bottles that are made using other plastics. These bottles are not always heat-resistant, so they cannot necessarily be fully sterilized. In addition, a hot-off-the-press research study from the US tested several BPA-free plastics for their leaching of hormone-active chemicals and found that some of them were in fact even more active than polycarbonate itself. This means, that being “BPA-free” does not automatically make plastics safer. The only non-leaching alternative to date seems to be glass.

And even the youngest generation is now picking up on this. A colleague from Consol Glass recently told us the story of how he converted his 5 and 3 year old nieces to glass, while looking after them during their mother’s absence. At the time Consol was preparing their new “Choose Health” ad campaign based on scientific evidence that glass is better for health than plastics. He showed them a picture of two mice (see photo), genetically identical but one of them – the fat one – was exposed to a hormone-active chemical like BPA during prenatal development. When the mice become adults they have the same exercise, food etc. but the fat one has a distorted fat storage due to the early-life hormonal influence.

The little girls decided that this was sufficient evidence for them to stay away from plastics. First, they got glass tumblers from Consol’s own production to drink from. Matters became complicated however when Mom returned and, in her normal routine, prepared school lunches with plastic bottles and boxes for microwave-heating – they simply refused and accused her or poisoning them! Emotions were running high and Mom, not happy at all, ordered the uncle to undo the damage – impossible because he too, is convinced of plastics’ harm to health. After reading up on the existing science Mom gradually began to understand the issues at hand, and peace negotiations started.

Now the school is involved, and lunches are never heated in plastics anymore – a very good start. Glass bottles are being developed that have a silicone sleeve to prevent breakage. And the little girls continue telling stories of fat mice for the benefit of all their friends!

BACKGROUND:

FEVE NOTHING campaign
⇒ http://www.nothingisgoodforyou.com/
“Can we rely on science?” by Chris Smith. European Plastics News, 17 November 2010
“BPA-free plastics may still pose health risk” by Lisa McTigue Pierce. Packaging Digest, 3 March 2011
⇒ http://www.packagingdigest.com/article/517205-BPA_free_plastics_may_still_pose_health_risk.php
“Born To Be Big. Early exposure to common chemicals may be programming kids to be fat.” By Sharon Begley. Newsweek, 11 September 2009.
Consol Choose Health campaign: South African TV ad, November 2010
⇒ http://www.consol.co.za/irj/go/km/docs/site/pages/watch_the_ad.html