Perfect Packaging Solution

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Container Inspection – Shoulder Inspection for BC-Machines

Parts Business – Repair Kits

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INTERNATIONAL TRADE FAIR FOR GLASS PRODUCTION - PROCESSING - PRODUCTS
DÜSSELDORF, GERMANY
29.05. - 02.06.2010
Reduce your parts inventory?

At Emhart Glass, we want to ensure that your maintenance is faster, easier and more efficient.

With S-Class you can drastically reduce the spare parts in inventory without compromising the availability for maintenance.

Our new S-Class service guarantees shipping of 5000 essential parts within 48 hours.

That means less downtime, more productivity and the opportunity to save costs by reducing your parts stock.

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Partnering for Perfect Packaging Solutions

✓ Choose parts and check availability online
✓ 5000 frequently used parts always in stock
✓ Shipped within 48 hours – guaranteed
✓ Rapid, reliable delivery
✓ Reduce your stock significantly
Emhart Glass revolutionized the container glass industry nearly 100 years ago with the invention of the glass feeder and the continuous glass forming IS-machine. During the following decades, Emhart Glass set the pace of innovation and defined the standards for this industry until today.

However, no one can rely on a glorious past only, and innovation is a moving target: increased demand for quality and efficiency is a never ending challenge for product innovation. In times of economic downturn, creativity is even more required to improve production with lower investments.

Therefore, we do not look back and dwell on the great history of our company; we are committed to innovation today and tomorrow, as expressed in our mission statement: “We support our customers in their quest for sustainable profitability, quality and increased market share in the packaging industry through our automation solutions.” For us, innovation is not a buzz word: our Research Center in Windsor is a unique example of a long-term investment for the benefits of and our commitment to the glass industry.

Now, nearly three years after the start-up of this pilot plant, we are preparing to launch a number of new products, with most of them having been created, modeled and tested in this unique “innovation plant”. The new product portfolio includes forming products, inspection products, as well as service products. This issue of the PPS magazine informs you about most of them, and some more “surprises” will be uncovered at the Glasstec in September.

This large number of new product launches might look like a one-time wave of innovation. But the future will show that this view is wrong: we see innovation as our ongoing contribution to our customers and to the glass industry. We will maintain the pace of innovation!

With best wishes

Glasstec 2010

Emhart Glass revolutionized the container glass industry nearly 100 years ago with the invention of the glass feeder and the continuous glass forming IS-machine. During the following decades, Emhart Glass set the pace of innovation and defined the standards for this industry until today.

The commissioning of the Emhart Glass Research Center (EGRC) was one of the most exciting and important events in the nearly century long history of Emhart Glass. It was on October 26, 2007 that the first bottle was produced from this new facility. The decision to build the research center was based on a long term view of what was needed in order to make a significant impact on the way Emhart Glass could develop and test products and solutions for the container industry.

Now, after nearly three years in operation, it is interesting to look back to see the effect the center has had on product development and research knowledge gained. Among many other developments, the Internally Cooled Blow Head (ICBH) was developed and tested at the EGRC during this period. Extensive testing coupled with computer modeling yielded significant production speed increases on several bottle types. To have done this without the EGRC would have taken at least twice as long and cost far more than it did due to the logistics involved in setting up multiple field trials and at multiple container plants. This also assumes that it would be possible to do speed trials on a full running production machine that could handle up to 10% increases.

As in any industry, there is a blend of near term and far term development that needs to be done to properly support the business. There are ideas today that could revolutionize container forming as we know it and these can be tried in the EGRC. It goes without saying that the most significant impact that the research center will have on the future will be on longer term developments. Needless to say, these will not be realized for several years, but will be the true test of how we are able to take full advantage of the valuable resource we have in the EGRC.

With best wishes

In this issue you will find:

The Glass-Alliance

At the Glassman show in Sao Paulo, Brazil, on March 9–10 2010, the Glass-Alliance made its first public appearance. All four members (Zippe, Horn, Emhart Glass, and MSK) were represented on their own stands, with common banners showing the Glass-Alliance logo.

Interest from the industry was intense, clearly demonstrating that the Glass-Alliance meets a significant market demand. This was further emphasized by several requests to provide the entire range of equipment and services required either to build a new glass container plant or to extend an existing plant.

Of utmost interest for companies investing in glass container plants is the ability to provide leading technologies for glass container manufacturing that work seamlessly together. With the Glass-Alliance’s capability to provide plant engineering as well as project management for the construction of the plant, the client can significantly improve their projections of project risk, thereby reducing that risk drastically. The client is also released from the complex processes of procurement, managing construction and overseeing commissioning and startup.

Potential clients can contact the Glass-Alliance through the sales organization of any of its four members, or through the Glass-Alliance website (see below).

The operational management of the Glass-Alliance has been strengthened by the appointment of Mr William Grüninger as General Manager on July 1, 2010. In this capacity he supports and assists the sales organizations of the four members in acquiring new projects for the Glass-Alliance. Mr Grüninger continues to hold the position of Vice President Technical Services at Emhart Glass.

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.

Technical News Bulletin

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
Emhart Glass moves Inspection Competency Center to Cham

Recently we began to move one of our Competency Centers from Madrid, Spain to Cham, Switzerland. Soon, our customers will be able to visit the headquarters of Emhart Glass and inquire about their Hot End as well as their Cold End inspection needs and concerns. In late September, the center will be opened and accessible for all our customers.

Emhart Glass sells more than just Inspection Machines. We aim to provide our customers with the automated solutions and the support they deserve. Since we participate in all markets around the world it is imperative that we have a strategy to support our customers in each of their respective markets.

In order to accomplish the challenging task of providing regional support in a localized manner, we have located (3) Competency Centers around the world. They are located in Clearwater, Florida; Johor Bahru, Malaysia; and our newest addition Cham, Switzerland.

What is a Competency Center?

Well, first and foremost, each of the Competency Centers is equipped with Emhart Glass Inspection machines. As a result, we are able to demonstrate the machines real-time to our customers, let their operators and engineers touch and feel the machines without having to travel tremendous distances. In addition, the competency centers serve as a hub for local Project Managers, Field Service Engineers and support functions. Customers are able to interact with the same personnel they work with in their plants.

What should a Customer expect from a Competency Center?

There are many benefits to having these regionally supported Competency Centers. Aside from localized demonstrations, the staff is able to provide training in local languages for the majority of our customer languages. Customers do not have to send their employees across the world – they can select from the closest or preferred Competency Center. In Europe, Middle East, Africa, Russia and CIS, they are able to send to Cham, Switzerland or Johor Bahru, Malaysia. For the North, South, Central Americas we have our Competency Center in Clearwater, Florida. In addition, customers can send containers for evaluations and test reports regarding defect detection capabilities.

We aim for the Competency Centers to provide support and service “Beyond the Machine”. We look forward to seeing you, someday in one of our Centers.

Glasstec 2010

Show Venue:
Düsseldorf Trade Fair Center, Germany
Duration:
September 28 - October 01
Opening Hours:
9.00 am - 6.00 pm daily

Emhart Glass booth:
13 C 43
Reducing Variance in Gob Delivery

*Emhart Glass has developed equipment (which will shortly be commercially available) for monitoring the gob delivery of the IS Machine. This is already leading to developments to further improve the delivery system.*

The monitoring equipment operates with sensor systems measuring gob length and velocity. For test purposes in the Emhart Glass Research Center the sensors were set up as shown in Figure 1.

Gob-position sensing is achieved using light sensors mounted one above the other, thus permitting the length and the velocity of the individual gobs to be measured. Each sensor is enclosed in a robust housing which provides cooling and mechanical protection, to ensure that they are suited to the environment on the IS machine. Figure 2 shows views of the CAD model and the actual sensor heads prepared for a Triple Gob IS section.

The information available from each sensor can be seen in Figure 3. This graphical display shows the length and velocity of each gob, whilst the variance in position relative to the other gobs for this section is also visualized. This information is recorded continuously so that trends in gob velocity and in gob length can be monitored over time.

There are two main reasons for gob variations: gob misalignment within the delivery system, and impacts caused during the tran-
tion of the gob between the components of the gob delivery system.

The first Gob misalignment occurs as the gob loads into the gob distributor head. Emhart Glass are now testing gob stabilizing units mounted directly in the funnel area of the gob distributor. These units have the effect of straightening and centering the gob to help in reducing variations as the gob passes through the scoop.

**Gob Stabilizer**

The series of images in Figure 4 shows the gob positioning immediately after shearing. The top image depicts the situation without the use of the stabilizer - all 3 gobs show a marked deviation from the vertical, due to the gob shearing.

The lower images show the gob positions after a stabilizer has then been installed for test purposes at the centre cavity only. Each image represents the situation resulting from increasing the stabilizing air pressure, demonstrating the verticality improvements for the centre gob.

**Scoop Profile**

Studies at the Emhart Glass Research Center have also indicated that changes to the scoop profile, and in particular to the cross section at the exit, can prevent the gob losing shape, and indeed in some cases actually improve the gob shape.

Figure 5 shows a computer simulation of how the new scoop cross section can reshape the gob. The standard scoop profile results in a gob which is being stretched (the leading end is traveling faster than the trailing end), whereas the new scoop profile gives a more uniform speeds resulting in less gob deformation.
Figure 6 confirms the theoretical results. High speed video images show the typical gob deformation as it leaves a scoop of conventional profile. The shape of the gob leaving the scoop with the modified profile is much more regular and is thus more likely to load properly.

Coanda Troughs

The next impact point is the entry to the trough. The majority of troughs are now fabricated from steel and coated with either an epoxy based dry coating or plasma sprayed coating. The effectiveness of these coatings is sometimes short-lived at the impact area of the trough. Epoxy coatings tend to wear through in a few weeks and plasma coatings also appear to lose their effectiveness gradually. The introduction of a small coanda nozzle in the impact zone, as shown in Figure 7, has the effect of cooling this area and more importantly providing an air cushion which reduces the impact, thus causing less damage to the gob and minimizing the variation in the final load to the blank mold.

The predicted results could again be confirmed in practice in the Emhart Glass Research Center. Figure 8 shows the measured variance in velocity just prior to the gob loading into the blank mold. The trough is steel coated with a standard epoxy dry delivery coating, and at the time of these measurement had been in operation for 10 weeks. As can be seen from the graph, the air was turned off to the coanda nozzle for a period, resulting instantly in a significant increase in gob speed variance, combined with an overall slowing of the gob. As soon as the coanda air steam is turned back on there is an instant recovery and variation of less than 0.2 m/second.

Conclusion

The changes in the past years were focused on reducing the cost to the producer by the use of universal delivery equipment, for example #0–2 and #2–3 ranges of scoops and troughs. The current research suggests that further improvements in gob delivery could be achieved by introducing more individual sizes of scoops in order to optimize the delivery of the gob to the blank mold. Development work at the Emhart Glass Research Center is continuing, with the aim of introducing a new range of optimized scoops. In combination with new designs of troughs and deflectors, the expectation is that gob delivery and loading should become much less variable, leading to fewer defects during the forming process.
Based on the latest Infrared imaging technology, the FlexRadar system is capable of analyzing hot glass containers as they exit the IS machine. Using Short Wave Infrared Imagers (SWIR’s) positioned directly after the IS machine on opposing sides of the conveyer, these SWIR’s provide images of the sidewall of each container. For maximum coverage and improved dimensional profiling two SWIR’s are used to generate images of both sides of the container as it passes.

The images produced by the SWIR’s 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 position on the conveyor. Cavities or sections producing outlying containers are quickly identified and visually displayed to the machine operator.

These are just some of the typical problems the FlexRadar system identifies.

> Horizontal and vertical glass distribution
> thick/thin glass
> gob loading problems
> cooling problems
> mold wear issues
> leaner, freaks, down ware, stuck ware, cold mold, pinched body, etc
> swung baffle
> dimensional issues
> container position on the conveyor

Identifying the problem containers is often a task left to the cold end inspection machines where the times to react are much longer. The FlexRadar identifies the problems up to 1.5 hours faster than the traditional methods improving the time to respond that translates to increases in pack to melt percentages. Optional rejection of stuck or down containers minimizes down time and keeps the lines operating smoothly. The system also supports non-round containers, tandem IS machines, multiple products on one line and operates at speeds up to 1000 containers per minute.

The SWIR’s are designed for extreme environments by incorporating sealed electronics with solid state cooling and backup vortex air cooling. The lower unit is made from rust resistant stainless steel and painted with durable powder coating finish. They utilize 1024 pixel imagers for clear crisp images of each container and run on low voltage DC power provided by the intelligent control unit.

The intelligent control unit is sealed with self-contained cooling and made from rust resistant stainless steel. This unit can be wall mounted or supplied with a floor stand.

The interactive user interface contains a high temperature 19” color LCD display with an integrated touch screen interface. It is also possible to locate multiple user interfaces throughout the factory and operator stations. An optional color LCD display with an integrated touch screen interface is available for control rooms and offices.

Several communication interfaces are available for the FlexRadar. Direct link connection to the FlexS control allows container information including the job name, container height, diameter and weight to be directly downloaded to the FlexRadar. An external Ethernet connection to the internet can also be installed allowing remote diagnostics and troubleshooting as well as technical specialist support. An interface is also available to most of the popular plant wide statistical process control systems.

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.

(Above) A typical distribution analysis screen

(first row)
- Glass distribution
- Uneven cooling
- Uneven/thin wedge bottom
- Choke neck
(second row)
- Freaks
- Fins
- Down ware
- Dimensional
Profitable, high speed, production of glass containers requires that glass forming process conditions are continuously maintained at the proper values. Traditionally, cooling wind timing and other such key process conditions have been adjusted manually by highly experienced machine operators and bottle makers. While, new measurement, and monitoring devices have become available to provide further guidance to the bottle maker, the adjustments today must still be made manually.

As Emhart Glass now supplies machines, control systems and monitoring systems under a common platform, there is now the possibility of integrating these systems and actually providing closed loop process controls. Researchers at the EGR (Emhart Glass Research Center in Windsor, CT, USA) are actively pursuing the development of this next step. Early results described here, give an indication of the potential benefits.

As an initial demonstration of the new technology, a prototype closed loop, blank temperature control system has been implemented at the EGRC which integrates the FlexIS Control System and TCS Temperature Control System on an Emhart Glass NIS Machine. Further visualization of the results are provided by the Hot End FlexRadar, a thermal imaging system, which analyzes all of the containers as they pass by on the flight conveyor.

As illustrated schematically in Figure 1, the closed loop system consists of four main components: 1) the control algorithm, 2) the FlexIS timing system, 3) the blank molds, and 4) the TCS temperature measurement system. As indicated in Figure 1, in operation, the desired operating temperature is
compared to the temperature of the left and right outer mold halves as measured by the TCS. Based upon this error signal, the control algorithm computes a change to the cooling wind timing. This is then sent to the Flexis control system, which automatically adjusts the valve timing on the section blank molds.

The results of this early demonstration are shown in Figure 2 and Figure 3. A screenshot from the TCS showing a time history of the left (blue curve) and right (black curve) outer blank temperatures is shown in Figure 2. Initially the control is off and a significant deviation in temperature exists between the left and right blank halves. At 13:40 the control is turned on, with the setpoint commanded to 410 deg C. The control algorithm then automatically adjusts the blank mold cooling to obtain the desired temperature, and by 14:00 the temperatures have converged on the setpoint where they then remain under the automatic control action. This demonstrates the ability of the closed loop controller to achieve the desired setpoints.

The positive impact of the automatic control action on the process is strikingly revealed by the measurements made by the FlexRadar. In particular, the FlexRadar is capable of measuring body lean in various body locations. In Figure 3, A screenshot of the Lean Measurement Screen from the FlexRadar corresponding to the same time period in which the control was exercised is shown in Figure 3. It can be seen that before the control is turned on the process is not well adjusted, and there is a very frequent occurrence of rejects due to lean (green circles and red spikes), by 14:00 corresponding to the time when the closed loop control has balanced the two mold halves at the new set point, the problem is seen to immediately resolve, and subsequent containers have acceptable lean levels without any rejects.

In conclusion, results of current work at the EGRC to develop closed loop control systems, highlights the promising potential of this new technology to positively impact production. Efforts to productize these new developments are underway.

Perfect Packaging Solution 3 | Aug 2010
Get more bottles per minute, by increasing the blow head effectiveness and capability, using the new Internal Cooled Blow Head Mechanism (ICBH).

The exact glass container shape is formed in the blow mold by final blow enabled by the blow head mechanism. The final blow air is applied by a blow head cooling tube through the container finish into the re-heated therefore stretched parison, to form, and cool the container. Beside forming the hot glass into the desired shape, which is accomplished within milliseconds an accurate pressure must be maintained to guarantee the optimal heat extraction from the surface of the finished container by maintaining contact with the blow mold. The pressure is controlled to ensure best heat transfer without creating other defects in the finished container.

As a contradiction the system must also guarantee an optimum heat removal from the container inside by exhausting the hot air from inside the container. This requires a balance between the:

> applied final blow pressure for container forming and an “ideal” heat extract on the container outside
> “adjusted” mass flow given by the designed blow head exhaust, as to maximize the exhaust and the internal cooling where it is most needed

It is a compromise between mass flow and pressure due to the restriction imposed by the boundary conditions. Achieving this balance is by itself challenging but in addition several system restrictions make it even more complicated. Key parameters cannot be set freely, for example:
Cooling tube length depends on the mechanical blow head mechanism characteristic:
- available straight stroke
- precision of the mechanism (worn out) during down stroke risking the cooling tube damaging the finish

Cooling tube diameter is restricted by the finish geometry (penetrates into unstretched parison)

All these necessary compromises restrict the final blow capability, so the full potential cannot be achieved. Different studies and measurement by Emhart Glass conclude, that the actual blow head - final blow system, after the container is formed, performs well below the optimum. For example a typical container could be “losing” this heat in the following areas:
- 42% transferred to mold
- 16% to bottom plate,
- 22% during final blow
- 13% convective

and only 7% at the inner container surface after final blow is applied (internal cooling).

ICBH can make the difference

The new Internal Cooled Blow Head Mechanism is called ICBH. This new type blow head overcomes the limitations of cooling tube length, which can cause the inadequate inner internal cooling, by not reaching the desired regions of the finished hot container. The new ICBH mechanism on NIS is capable, after the final blow has formed the container, to oscillate so the best possible inner heat removal is achieved. The short wave infrared (SWIR) images, taken by the new Emhart FlexRadar Process Monitor System visibly shows the superior capability of the ICBH technology.

The cooling tubes length can be designed to the specific container requirements and ensures an ideal internal heat extraction. Start of the cooling tube penetration is controlled by an independent event. It allows the finish penetration of the formed container to the desired position. By oscillating the tube, specific requirements can be optimised. The heat at the correct region of inner container surface is removed. To prevent “bulls eyes” at the inner container bottom, the cooling tube exit requires special optimisation. A special nozzle guarantees an ideal internal cooling and reduces the risk of creating defects.

On the NIS, the blow head lift can be controlled, due to the servo technology, after the container is formed to increase the exhaust, to increase the mass flow for extracting even more heat. The available proportional valves (FPS) for final blow allow programming of different pressure steps during the container forming and internal cooling optimization.

Tests and simulations at the Emhart Glass Research Center (EGRC) have proven that the inner glass container heat extraction can be increased up to 130%. Depending on the type of glass container, considerable speed increase potential is confirmed. Various containers demonstrated speed increase potential of more than 10%.

The Internal Cooled Blow Head mechanism (ICBH) will make the difference to get more bottles per minute by the superior blow head effectiveness and capability. The full final blow potential is now optimized.
In the game of glass manufacturing, victories are not won by leaps and bounds, but by inches. Small savings in heat and energy can pay large dividends in operating costs. As such, glass manufacturers work hard to find the most cost effective means of insulating their furnaces, distributors, forehearths, and feeders without compromising the glass. In the case of the feeder, one of the greatest areas of opportunity is the spout, or feeder bowl. This is the final step in the glass conditioning process, making this the last material the glass touches before becoming a container.

The spout insulation fulfills several roles with respect to the functionality of the feeder bowl mechanism. It insulates the spout, conserving heat. It provides support for the spout refractory and protects it from thermal shock. If a crack were to develop in the spout refractory, the backup layer is the next material the glass will come in contact with, so resistance to molten glass is very beneficial. Due to these functions, there are several factors to consider when choosing an insulation package for a spout, such as insulation value, strength, resistance to molten glass, ease of installation and removal, and cost.

One of the best materials currently available for its insulation value are microporous panels. They are available from multiple suppliers, and offer some of the lowest thermal conductivity coefficients achievable. However, microporous panels are quite expensive, and filling the entire cavity with these panels is cost prohibitive. As a result, a common practice has become to use one or two layers of panels directly against the steel casing, while using a second form of a less expensive insulation between the panels and the refractory.

In order to fill the remaining cavity, the materials most commonly used are diatomaceous earth, chopped fiber insulation, and insulating castable. Diatomaceous earth has long been the standard throughout the world for spout insulation. It is a dry granular material that must be densely packed into the cavity between the refractory and the steel. It is the most difficult to install, because the process is time consuming and great care must be taken to ensure that no voids remain underneath the spout. Voids leave the spout unsupported, and uninsulated, often leading to cracks in the refractory. Diatomaceous earth does not tend to be very effective against molten glass, although it does fair better than chopped fibers.

Chopped fiber insulation is generally the easiest of the three to install and remove. The cotton-like material is placed underneath the spout so that it is loosely packed to maximize its insulation value. Unfortunately, the loosely packed insulation provides very little support for the refractory, and should the refractory develop a crack, the chopped
fiber will quickly be dissolved by the molten glass, allowing the steel casing to fill.

Castable insulation is a relatively new material for this application. Emhart Glass has worked to develop a castable specifically designed for spout insulation, that addresses the shortcomings of both chopped fibers and diatomaceous earth, named EmCast 25. It is combined with water at a ratio of 1:1 by weight, and poured into the cavity between the spout and the insulation panels. The consistency of the material is such that it will flow underneath the spout to ensure that the cavity is completely filled. The castable must be allowed to set, or harden, before moving forward with the spout installation. This generally takes between one and two hours. EmCast 25 provides a better insulation value than either chopped fibers or diatomaceous earth. It has enough strength to properly support the spout, yet is still weak enough to allow the material to be easily removed when the spout refractory must be replaced. EmCast 25 has also been designed to resist molten glass in the event of a crack in the refractory. In the event that molten glass does come in contact with the castable, components in the castable combine with the glass to raise the melting temperature, effectively freezing off the glass.

By calculating the steady state heat flow, the amount of heat loss for the various forms of insulation can be compared, Figures 2-4. Thermal conductivity values for each of the materials was measured by ASTM Test Method C-1113, Thermal Conductivity by Hot Wire, and the case temperature reported in Figure 3 for EmCast 25 was verified to be within 30°C of actual measurements. The difference in heat loss between EmCast 25 and chopped fiber insulation was calculated to be approximately 450-500 °C, depending on the size of the cavity. As a result, EmCast 25 keeps more heat inside the spout than either chopped fiber or diatomaceous earth.

The choice of spout insulation is an important decision when operating a glass container plant. It can greatly affect the efficiency of the feeder in regards to heat and energy, as well as manpower and downtime. There are insulation packages that have been used effectively for decades, while new methods have been developed to ease the installation without sacrificing other properties. It is important to consider all of the above when choosing the insulation package that best suits the needs of the plant, and not to underestimate the importance of the insulation.
Plug Dip Ring

As we all know, verification of the bore diameter and flatness of the sealing surface are two of the most critical inspections on glass bottles. If the bore is too small, the filling tube can stick and break during the filling process. If the bore is too large on a wine bottle, the cork will not seal. If the sealing surface is not flat and complete, the cap will not seal leading to leakage or possible contamination.

Verification of the bore diameter (usually referred to as “Plug”) was originally done manually by inserting rods of the proper diameter into the neck of the bottle. If the rod went in without sticking, the diameter was not too small. If measuring for corkage was important, a slightly larger rod would be used to verify that the bore was not too large. This same basic measuring technique could be used to check the outer diameter of the finish by placing a cup over it. This measurement was called “Ring”. These methods were used because they were very simple and relatively quick tests to give a go/no go result.

The flatness of the sealing surface was checked by placing the sealing surface against a flat metal plate and checking for any gaps between the plate and the finish. If a single gap was detected usually using a feeler gage, the defect was called a “Dip”. If two gaps were detected, usually by rocking of the bottle against the plat, the defect was called a “saddle”.

© Rich Diehr
(Manager Cold End RD & E)
Although these tests were effective, they required labor and they were not practical for 100% inspection. Customers wanted to reduce labor, improve consistency, and inspect every bottle produced. In 1965, Emhart developed an automated machine that would check bottles for Plug and Ring at over 200 bottles per minute. In 1967, Emhart developed the technology to check for leaks caused by Dip or Saddle defects and, in 1970, combined these inspections into the Dual Head Gager.

Over the years, Emhart has provided the glass industry with over 5500 machines using this technology to inspect for Plug, Ring, Dip, and Saddle defects. This same basic technology is used by virtually all glass makers world-wide to perform these inspections and has been the industry standard for more than four decades.

Although these inspections have been very simple and reliable, they do have their downsides. They require bottle specific tooling that wears and requires maintenance and/or replacement. The finish of the container is contacted, which could result in damage or contamination and even the possibility of breaking a plug gage off in a bottle. The depth of penetration of the plug gauge would limit the maximum speed of the machine. They do not provide actual measurements that could be used for process control. Customers had interest in doing these inspections with a non-contact system, that could provide more than go/no go results.

With the development of the Veritas family of inspection machines, Emhart provided the glass industry with the first non-contact vision based Plug, Ring, Saddle, and Dip inspection capabilities. The Veritas iB had inspection stations to do Plug, Saddle, and Dip, while the Veritas iM had a station to do vision Ring inspection. All of these inspections were done with no container specific tooling, no contact to the finish, and provided actual measurements of the dimensions.

With the development of the FleXinspect T, all of the vision gauging functions are brought together in one rotate station. The bottle enters the station and as it rotates, multiple images are acquired and analyzed.

The following inspections are done at speeds up to 400 bottles per minute with each measurement in real world units. This measurement data is mold correlated and output through an Ethernet connection for collection by a plant wide network. This data can then be used for process control. The FleXinspect T providing the ultimate inspection for Plug, Dip, and Ring inspection! •

\[\text{Dip} 0.6725 \text{ mm} \ (0.5326 \text{ mm} \text{ to} \ 0.1399 \text{ mm})\]

\[\text{Saddle} \ 0.4016 \text{ mm} \ (0.2080 \text{ mm} \text{ to} \ 0.1936 \text{ mm})\]
Linescan     Sidewall

Defects in the sidewall of glass bottles that could lead to breakage or risk to the consumer have always been critical to detect and reject. Some of these defects include stones, blisters, plunger pulls, stuck glass, and birdswings. In more current times cosmetic blemishes have become more important to detect as glass is seen as a premium packaging material and these defects could degrade the products image.

Originally, sidewall defects were detected by a person sitting at a light station, watching each bottle coming down the line and removing any bottle that had a fault in the sidewall. Although the person could differentiate defects from packable irregularities very well, there were disadvantages. Inspectors would quickly (approximately 15 minutes) fatigue and become less effective. As production speeds increased, the task became more difficult, resulting in the need to split the task between multiple inspectors. This all resulted in a high cost in labor and the risk of missing defects based on human error.

In 1975, Inex first patented an automated sidewall inspection system. This technology went into a series of machines including the RBI, 1055, 5-512, and Super Inspector (SI). These machines used three views of the bottle to detect critical defects. The bottle was turned 90 degrees as it passed through the machine to ensure complete coverage. These machines were the industry standard for over two decades.

As line speeds increased and bottles became more complex with shapes and embossments sidewall inspection requirements changed. Customers did not want to turn the bottles at the higher speeds or if they were non-round. They wanted to inspect defects on the first surface and not need to detect defects looking through embossments on the opposite side of the container. This lead to the development of four camera systems, with two cameras located on each side of the conveyor to view the bottle with four 90 degree views.

Although the four camera systems eliminated the need to rotate the bottle and they viewed defects on the first surface, they struggled to get full 360 degree coverage. This was mostly caused by what is referred to as edge slice. Edge slice is where the light near the sides of the bottle image appears...
dark as the light refraction will not allow
inspection in this area.

Emhart Glass realizing the deficiency
of the four camera systems developed the
Veritas iC, which was the industries first six
view system. The Veritas iC uses three cam-
eras on each side of the conveyor reducing
the area to be inspected in each view to 60
degrees. The Veritas iC also utilizes an ad-
vanced LED lighting technique, referred to
as wrap-around lighting, which reduces the
dge slice in the images. The use of six views
have now become the industry standard and
been replicated by most all competitors.

The current state-of-the-art inline inspec-
tion is established with the FleXinspect C
and FleXinspect BC. These machines take
images from six angles, but use up to 18
cameras taking 24 sidewall images. These
systems take six opaque, six transparent, six
stress, and six shoulder views of each bottle.
Each of the images is taken with a very high
resolution camera and customized lighting.
Specialized algorithms then inspect each im-
age at speeds up to 600 bottles per minute
and determine if the bottle meets the cus-
tomer’s quality standard.

In an effort to provide an alternative to
the ever increasing number of views taken
by inline sidewall inspectors, the FleXinspect
T linescan sidewall option was developed.
The FleXinspect T features a unique rotary
system that allows placing cameras, optics,
and lights both inside and outside of the
starwheel. The machine also features modu-
lar rotators that can be placed to allow maxi-
mum inspection access.

The basic linescan sidewall system uti-
lizes two linescan cameras looking directly
through the center axis of the bottle as it ro-
tates, providing true 360 degree inspection.
The height of the two cameras can be adjust-
ed to provide coverage over the complete
height of the bottle. Utilizing this imaging
method edge slice is eliminated, all defects
are seen on the first surface, the defect size
and shape is very consistent, and seen with
no distortion.

Using the unwrapped image of the bottle
greatly simplifies the inspection setup. There
is no need to setup for the shape of the bot-
tle, so placing inspection zones is very sim-
ple. Defects are seen with no distortion, so
setting reject limits can be done using actual
defect size. Embossments can be located
and inspection done in and around them.

The FleXinspect T can also inspect many
non-round bottles as long as they can be
rotated. This inspection in many cases can
provide inspection capabilities not easily
achieved on non-round bottles with inline
sidewall inspection systems. Many non-
round bottles can be unwrapped to provide
an image for inspection that is very similar to
round bottles and much easier to setup on.
This is especially effective for inspection in
the corners of the bottle.

The FleXinspect T additionally has the op-
tion to have a dedicated shoulder inspection
view to do detailed inspection of this area on
bottles with steep shoulders. This view can
eliminate or simplify the inspection of the
shoulder where other sidewall systems will
struggle or have blind spots. This inspection
can also work on non-round bottles and/or
bottles with embossments in this area.

The FleXinspect T also has an option
to do a dedicated high resolution inspec-
tion in the thread and upper finish area of
the bottle. Using a unique optical imaging
method, the thread area can be unwrapped,
providing a superior image for inspection in
this very difficult area. Custom algorithms
inspect this area, looking for the normally
occurring threads and detecting any defects
or missing portions of the threads. The FleX-
inspect T Sidewall inspection providing un-
precedented inspection capabilities!
Mold codes placed on glass containers identify which mold cavity produced the container. This method of traceability is widely used throughout the glass industry for identifying a particular mold consistently producing defective containers.

Mold codes used by sampling machines can identify changes in the production process. Various types of mold code readers (MCR) are used to identify and select or reject the suspect container depending on the application. These mold code readers can be stand-alone machines or added to online inspection machines as options. When integrated into inspection machines, the correlation of defect to mold is extremely important in improving the forming process. The mold correlated data extracted from these inspection machines identify the defect type, percentage of rejects and mold number. With this information, machine operators at the IS machine can solve the problem.

Three different types of codes are typically used on the container and are engraved into the mold that produces the container. The type selected is typically based on container size, shape, and the number of mold cavities needed.

The dot code is the most common type, composed of a pattern of dots and spaces that are located above the heel or on the base of the container. These types, referred to as heel codes and bottom codes, are comprised of varying code lengths and number of dots. Both the length and number of dots can change depending on the number of molds needed and size of container.
Engraving the mold code in both mold halves can improve the read rate on round containers by providing a level of redundancy. This dual code helps to reduce reading errors.

The Peanut code located on the base of the container applies for both round and non-round containers. This code can support 127 cavity numbers.

The Alpha numeric/seven-segment code is also located on the base of the container and used for both round and non-round containers. It can support 255 cavity numbers.

Methods of container positioning and decoding the mold codes

Rotating the container while looking at the code area with a photoelectric sensor and light source, is the most common and reliable method for reading the heel dot code. The sensor detects the absence and presents off light reflecting from the container. The result is decoded, based on the rotation direction and dot configuration of the code. The method is integrated into the FleXinspect T rotary inspection machine.

The heel code can also be decoded using camera based vision technology. This method has two options, looking from the top down or looking from the bottom up. The geometry of the container dictates which option to use. This method is integrated into the FleXinspect BC inline inspection machine.

The base codes are also decoded using camera based vision technology that decodes the Peanut, Alpha numeric/Seven-segment, and dot codes located in the base of the container. The configuration of the camera is normally looking from the top down for this application. This method can also be integrated into the FleXinspect BC or FleXinspect T.

Read rates are directly proportional to the quality of the engraved code. As the mold wears, the code becomes less defined reducing the level of contrast it produces. In some cases, the code is not readable due to the lack of code sharpness.
Inspecting the steep, and sometimes almost horizontal, shoulders of non-round specialty containers has always presented special challenges that often required additional manual inspection and defect detection compromises. A new sidewall inspection configuration option, now available on the FleXinspect BC and Veritas iC, reduces the need for additional manual inspection and virtually eliminates inspection compromises.

In this new configuration, an additional six, high resolution cameras are mounted so that they can be focused directly at the shoulder, and the wrap-around LED light panels are repositioned to enable optimum back lighting for shoulder inspection without affecting the integrity of other sidewall and dimensional inspections. The shoulder inspection option has been field tested and has been in operation under production since March. This customer reports that the shoulder inspection option is “catching things that we might miss at the light stations ... my guys have 30 years of experience with vision inspection and are amazed; we’re able to get out things that other inspection systems never could, and we are putting out a better product.”

Detecting defects in the shoulder of a bottle has always been challenging because of its shape. Whenever possible, vision systems are always employed to detect defects instead of manual inspection. Some specialty containers (such as spirits and pharmaceutical jars) have shoulders that are nearly, if not completely, horizontal. For these special applications, the cameras need to look down at the container instead of across to capture a complete view of the defect. With the new shoulder inspection configuration option for the FleXinspect BC, the shoulders of most
specialty and non-round containers are no longer impossible to inspect.

Focusing six additional high resolution cameras directly onto the shoulder of a bottle dramatically increases the inspection area of the container. Similar to the opaque and transparent cameras, the shoulder cameras are positioned so they completely cover all the way around the container, so there aren’t any blind spots. The 1.4 megapixel camera is a standard item for the shoulder cameras and the lens is sized specifically to meet the customer’s requirements. The sidewall light panels are also positioned below the conveyor chain, so the shoulder inspection cameras are backlit with their own dedicated adjustable lighting to catch defects. The shoulder inspection option, together with a fully configured FleXinspect BC now inspects 30 images of every container as it passes through the machine.

All of the inspections in the FleXinspect BC are essentially set up the same way, so training is simple and consistent for the entire machine. The Sidewall Meta Tool is the ideal tool for inspecting defects in the shoulder area of the container. It provides the ability to register, generate enhanced images, place zones, and add up to three inspection algorithms per zone. Once the tool is set up on the first shoulder camera, the settings are replicated to the remaining cameras and then individually fine tuned. Since the shoulder cameras use the same inspection technique as opaque and transparent inspections, the learning curve is fairly easy for most machine setup technicians.

Feedback from customers already using the shoulder cameras is, that they are amazed by the detail and the clarity of the images. It’s proven that the new shoulder inspection option compliments the product nicely and offers benefits that can only be met with a machine as innovative, versatile, and powerful as the FleXinspect BC.
Nothing too COLD about Data Collection and Process Control

How warm or cold would it feel in your house without the ability to set a desired temperature, a home without temperature control? The thermostat has a temperature set point to “control the process” of heating or cooling your home. The thermostat displays your temperature setting and the current temperature, providing you the feedback and knowledge to decrease or increase the set point and achieve your temperature comfort level.

Nothing too COLD about Data Collection and Process Control

Imagine an automobile without a speedometer, perhaps the flashing red lights in your rear view mirror will let you know when you have exceeded the posted speed limit. Process control systems are all around us and these are two examples of process control with feedback mechanisms to help “control the process” of controlling the temperature of your house and the speed of your car.

The MiniLab Data Collector from Emhart Glass, is the glass container manufacturing process control system. The MiniLab Data Collector receives all of the container measured dimensions, along with the thresholds and set points of those container dimensions, from the MiniLab. These results are displayed, can be printed out in a shift report or archived onto the MiniLab Data Collector. Shift reports can be reformatted to fit your specific production report needs.

The MiniLab Data Collector continuously updates every minute and allows you to monitor any container dimensional specification during the glass manufacturing process. This enables manufacturing personnel to correct container dimensional deviations before they are outside of your customer’s specifications. The MiniLab Data Collector not only provides the right tool to deliver a quality product, but also reduces the number of rejected containers and increases the production pack percentage.

Despite the ongoing expense of operating labor to manually collect glass container measurements for manufacturing process control, it has always been thought of as a luxury to automate glass container dimensional inspection. The overall image that comes to mind; is the laborious, often subjective and costly undertaking of hand gauging all the container parameters and then manually capturing this detailed dimensional data every couple of hours.

Though never admitted during production, the continuous manual inspection and documentation cycle is often neglected, deficient and proliferated with analytical errors. An analysis of this arduous, labor intensive, and expensive data collection technique has yielded a precise, repeatable and labor saving statistical container measurement system from Emhart Glass. The MiniLab, complemented with a Data Collector for process control feedback, provides automated statistical container measurements used to control the manufacturing process at a glance.

Experience the importance of the MiniLab’s timely and accurate statistical Data Collector. Let Emhart Glass demonstrate how to turn an empty space on your production floor, into an investment. Witness for yourself the ROI (Return on Investment) that the MiniLab and Data Collector can offer by saving you money in less than one year. •
Is Glass Pluckfastic*?

While the Gulf of Mexico is battling one of the worst oil “spills” ever another type of pollutant is challenging our marine ecosystems: Plastic. Since the Great Pacific Garbage Patch came to fame during the last year, another area of dense marine plastic debris has been reported, the North Atlantic Garbage Patch. In fact, experts assume that further such regions will be discovered, because plastic accumulates in so called “gyres” – areas with circular oceanic currents.

In February 2010, Audi aired its Superbowl intermission TV ad that sports the Green Police. The clip paints a picture of a society that does not tolerate environmentally unfriendly behavior and prosecutes people who overstep the line – like the man at the supermarket check-out choosing a plastic bag rather than recycled paper, or the two kids that drink water out of plastic bottles. It seems environmental consciousness beyond climate change has arrived in the mainstream. Even a new word to describe non-plastic products has been created: pluckfastic.

But like with most trends, there is a counter movement. Plastics have worked hard to frame sustainable development in such a way that their products look good. Based on the low weight of plastics, CO² emissions during transport are below those for heavier packaging materials – like glass. And the plastics industry seems keen to maintain this position, as a label on a recent aircraft-served wine bottle demonstrates (photo).

Note the last line “better than glass for the planet and you”. Really? This plastic bottle is made of polyethylene terephthalate or short PET, a purely synthetic chemical concoction derived from just that same crude oil that currently is killing life in the Gulf of Mexico. Making 1kg of PET requires more energy than making the equal amount of glass (but of course we need more glass to make the same functional unit as PET). A recently published life-cycle analysis (LCA) compares the carbon emissions for making a glass bottle with a PET bottle and an aluminum can: actually the glass bottle has the least CO² emissions. It is important to note that in this LCA the full life-cycle is analyzed – from cradle to cradle. Not all LCA’s are as inclusive, explaining why differences are seen and why this issue can be controversial.

But what glass inarguably does better than PET is the leaching of synthetic chemicals into the foodstuff it protects. Glass does not contain synthetic chemicals, it is made at such high temperatures that any synthetic or biological contaminants are pyrolyzed. On the other hand, it has been shown that PET leaches a number of different synthetic chemicals, including the carcinogenic formaldehyde, UV blocking-agents and other compounds with endocrine disrupting properties that have not even been identified yet. Until the science is clear what these substances are, and most importantly whether they are safe for humans, it seems preconceived (if not simply wrong) claiming PET is better than glass for human health. And to answer the question: Yes, glass is pluckfastic!* 

*the urban dictionary on Pluckfastic: (adj)
1. alternative to plastic conceived or appearing as if conceived by an unrestrained imagination; fun and creative alternatives to the single use plastics that pollute our ocean and beaches (e.g. a pluckfastic bag, bottle, fork).
2. extraordinarily good quality, made to get the job done then biodegrade, in reference to an alternative to disposable, toxic plastic.
3. an exclamation in response to someone using a reusable or biodegradable alternative to disposable, single-use plastic. (Source: Wallace J. Nichols, pluckfastic.org)

References

Audi Superbowl ad “The Green Police”: http://www.youtube.com/watch?v=Wq58zS4_jvM


Pluckfastic: http://www.pluckfastic.org
Managing parts inventory with the S-Class Program

Emhart Glass maintains the world’s largest stock of parts and accessories for glass container machines, refractories and inspection equipment. Five thousand Hot End and Inspection parts are always available directly from shelf and can be shipped within 48 hours of the order being received. Refractory parts can be finished off to the required configuration and shipped within eight working days. Rapid shipment is ensured by our partners’ global logistic network.

S-Class offers our clients a unique opportunity to reduce their spare-part inventory significantly. As a result, they can also reduce their employed working capital. Parts and accessories can be ordered only when they are actually required, and not held as stock for long periods. This generates a quick turnaround time of parts in stock for Emhart Glass as well as for the customer, so the latest revision of each part will always be delivered. Each part will be in perfect condition, and carry the normal Emhart Glass warranty. Inventory held at our manufacturing units in Sweden and the USA ensures good availability and reliable, fast delivery times.

S-Class includes all the most frequently requested items for daily maintenance and repairs, as well as spare parts for emergency situations. Parts offered cover all our latest products as well as our extensive installed base of standard equipment. Items offered include wear and tear parts such as shear plates, pusher fingers, refractories, cams and shafts, plus commercial parts such as screws, o-rings, nuts, bolts and fittings, as well as parts for our control systems and accessories such as mold holder inserts, baffle arms and plunger cartridges and positioners. The program does not include larger assemblies such as mechanisms or sets of deflectors, which are normally purchased in advanced with a longer planning horizon and carry a standard lead-time.

Access to the S-Class program is very easy. Customers do not need to identify at the time of order which parts are part of S-Class, as this data is stored in the Emhart system. Provided there are no shipping or other restrictions, S-Class items are delivered virtually immediately, whilst the remainder will be shipped as soon as they become available. We have developed a search engine on our website (http://www.emhartglass.com/s-class-search-engine) where you can search for S-Class parts and also easily track the mechanism in which they are used. This is a helpful tool for workshop and purchasing personnel to explore the additional potential of the S-Class parts program to increase availability of parts while reducing plant inventory. The lists are also available as Excel spreadsheets on request.

We can also analyze your inventory to help you streamline your operation and benefit from reducing inventory levels, while still ensuring that parts for repair and maintenance are always available.
Maintenance and repair kits - quick and easy

The maintenance and repair of mechanisms, accessories and production-related equipment such as valves is the daily business of every workshop in the glass container industry. Part of this work is to physically repair the mechanism in the workshop, but another important task is to order all the individual parts that are required and pick them in the right quantity from stock. Although obtaining the parts does not contribute directly to the efficiency and effectiveness of repair work, it is still very important.

Emhart Glass has recognized the demand for more efficient maintenance and repair solutions. However, any solution should not create additional work simply in order to allow a quick turnaround time in the workshop. The concept of maintenance and repair kits makes preparation very quick and also simplifies the actual task of repair and maintenance.

We offer two types of kit. The maintenance kit, called KB Kit, includes all the parts required to reassemble a mechanism or accessory after routine inspection and cleaning. The repair kit is called KC Kit and comprises all the parts required for a major repair of an assembly or mechanism. Its contents are selected in such a way that all major wear and tear parts are exchanged, and the refurbished unit performs nearly as well as a new one.

Each kit is packed in a separate box including all the parts required to maintain or repair one unit. Each part is clearly marked with its own part number to avoid confusion and mix up of parts. A drawing of the assembly is also included. Clear markings on the outside of the box indicate which mechanism and level the kit is designed for. Workshop personnel simply have to pick a single item from stock to perform the repair, instead of having to pick a range of individual items. This ensures that the correct parts are used for the repair and that all the parts that need to be exchanged are definitely available, reducing preparation time significantly and also ensuring a high-quality repair. An additional benefit is that the kit can be ordered with just one item number, instead of tediously working through drawings to identify each individual part.

Kits are available for all current Emhart Glass products, mechanisms and accessories in a standard configuration. The suffix ‘KB’ or ‘KC’ after the part number indicates whether the kit is a maintenance or a repair kit, respectively. Clients requiring customized kits to meet a specific demand can configure them in collaboration with Emhart Glass; the benefits will be just the same as with the standard packages.

Maintenance and repair kits are an attractive solution for cost-effective maintenance and repair for workshop personnel, inventory handling and purchasing. Not only do they reduce the cost of mechanism maintenance and repair, but they also ensure that all the necessary components are available, clearly identified and in line with the quality demands of the original equipment supplier.
Update on Emhart Glass Hot End Service Products

One year ago, Emhart Glass launched an extended suite of Hot End service products. Since then, our service portfolio has been augmented still further with the addition of more invaluable services that are unique in the glass container industry.

Customer Process Support

These services help our customers improve their forming processes. They are structured in six modules and can be ordered individually or as a complete set, depending on their relevance for a specific container:

- Accessory selection: Your solution for the right choice of accessories
- Mold cooling analysis: Your solution for controlled mold temperature distribution
- Forming simulation: Your solution for a stable forming process
- Container producibility analysis: Your solution for superior glass container production
- Container property analysis: Your solution for reliable high-performance containers
- Mold equipment drawing set: Your solution for an effective mold design

Details on the scope of these modules can be found on our website. Despite the high demand for these services, we can deliver a first report within two weeks of your enquiry.

Hot End Training Courses

Emhart Glass’ training courses about the operation and maintenance of our equipment are in constant demand. They can be held at either of our Hot End manufacturing locations in Sundsvall (Sweden) or Johor Baru (Malaysia), or at your own site. Although each course is carefully structured, a modular content system means that individual demands can easily be fulfilled. The scope of each of our standard training courses is available from our website.

Recently, a new training course on “Mold Design” has been developed (see separate article in this edition). Starting with the fundamentals of the three standard IS forming processes, the essential theoretical information is provided and illustrated with real-life case studies taken from your own day-to-day workload.

FlexIS Remote Service

This unique new service has been developed in the last few months in cooperation with our customers. (A separate article in this edition of PPS describes the service in full detail.) In the manufacturing sector, such remote services are known, but not yet state of the art. Emhart Glass is proud to be able to offer such services as of Q1 2011. It will allow clients to reduce downtime drastically and save significant cost, since an Emhart Glass Remote Service specialist is standing virtually “at your side”, with no delays due to travelling time.
Technical Assistance Agreements (TAAs)

Technical Assistance Agreements have been used in the glass container industry for years. However, until now they have been made between two glass container manufacturers. Emhart Glass is the first equipment supplier who can provide this type of technical assistance truly independently from a potential competitor of the customer. This independence allows our specialists to take an undogmatic approach, adapting freely to the customer’s own forming philosophy and helping it to evolve it to new horizons and potentials.

The starting point of a TAA is always an in-depth audit at the customer’s facility to understand its strengths and potential areas for development. Each individual TAA is tailored to the customer’s needs as revealed by the audit: scheduling, resources, targets and organization are all defined. Setting clear and achievable targets at the outset is essential. Through close collaboration between specialists on both sides, targets are identified, production tests conducted, results analyzed and judged and finally solutions are verified. Over the lifetime of a TAA, regular reviews at management level are conducted in order to adjust the scope of the TAA to any changes in the customer’s requirements.

Consol Glass was entering into a new era of new IS Technology to replace obsolete equipment. After a full evaluation Consol started the process of deploying three different Emhart IS Machines (5inch, AIS and NIS). The support through a formal structured Technical Assistance Agreement with Emhart Glass has provided significant contributions in Consol’s quest to continuously improve the efficiency and profitability of our operation. The support has ensured full optimization of the Emhart equipment employed plus the vast experience within the Emhart support group has benefited our operations. Through a working relationship/partnership we were also able to assess the capabilities of the production specialists for Emhart Glass that nicely matches our technical requirements as well as our culture and approaches as they have evolved in our history.

Brian Roger – Group Operation Director Consol Glass South Africa
Emhart Glass has introduced new premium mold design engineering course designed to help clients enhance their mold-design capabilities and optimize their production.

As the creator of the IS process for hollow glass manufacture, Emhart Glass has defined standards in every aspect of mold design, from the IS machine interface and mold gears through to the parison. As these standards have become universally accepted, so Emhart Glass has become recognized as the reference point for mold design, and its training in mold engineering has been adopted by glass plants and mold manufacturers around the world.

Since the creation of the Process Customer Support team two years ago, Emhart Glass has strengthened its support in mold design, offering expertise and service in parison design and forming simulation, mold cooling analysis, container performance analysis and many other areas.

Now, following a comprehensive update of its mold-design know-how, Emhart Glass has launched a completely new premium course for glassmakers and mold manufacturers. Lasting five days, it is divided into two parts: theory and practice.

The theoretical phase covers mold design interface and parison design, including:

> The key IS processes (B&B, P&B, NNP&B)
> The limits and restrictions imposed by IS mechanisms on mold design and equipment design
> Understanding the importance of mold gears, and their influence on production
> Mold cooling – the principles of VertiFlow and InVertiFlow cooling systems, including influences on mold temperature distribution and the IS production process
> Container requirements: how each container design delivers certain mechanical resistances or property specifications, and how mold design can influence the resistance of a container
> Parison design training for B&B, WMP&B, NNP&B and LWP&B: the rules of designing a parison, and the influences of each parameter on the final glass-thickness distribution.

The practical phase includes exercises centered on customers’ own containers, followed by forming simulations for each design. Typically, this phase will focus on parison design, mold setup and mold cooling, as well as covering production issues and defects in order to bring the mold designer closer to the production process.
The mold design training was done in 5 days divided in two sections:

1. Actual Theory of Mold Design for the 5"1/2 machine covering Blow & Blow and NNPB Process
2. Verification of two designs made by Vidroporto Mold Design Engineers

We wanted to expose as much as possible departments. We had eight employees from Mold Shop, Mold Design and Production attending the training. People from our sales department were also present so they could have a better idea of the limitations and constraints the process has.

For all the participants the feedback was that they had their expectations exceeded not only by the high level of information but also in regards to the material used to teach the course and the didactics of the Trainers who were very thorough in going in depth to answer all the questions and doubts during the whole Training.

This resulted in a very good absorption of the knowledge being transferred. The subjects were covered with a lot of care in order to allow an easy application in the mold design process. This will for sure result in production performance increase in the future.

The trainers were very well prepared and knew the specificity of our Production. This sprang a discussion about adaptation of our Mold Design in order to allow interchangeability of molds between our 5"1/2 and 6"1/4 lines. This will give us, welcomed production flexibility. A side result of the investment made which we are already implementing.

(Mário Nunes Pinho, Vidroporto, Brazil)

Training can be held either at Emhart Glass’s own facilities or client sites. On-site training is fully customer-specific, and will be customized to the individual client’s needs.

Producing high-quality containers requires strong partnership between every department involved in developing the container and the production run. This new course from Emhart Glass will help your glass plant engineers to progress well beyond a first step.
Wouldn’t it be great to have an expert at your side whenever a question or an issue arises about your sophisticated IS machine controls? Could you improve your machine uptime and productivity? If your answers are “yes”, “FlexIS Remote Service” may be the right solution for you.

With the introduction of the powerful FlexIS controls, modern IS machines have become much more electric and electronic devices compared to the traditional mechanical machines of the past. Recently, the installed base of FlexIS controls crossed the mark of 320 units and keeps growing. In parallel, the number of service requests we receive related to FlexIS controls is increasing every year. Many FlexIS service requests could be quickly resolved remotely, with no need for a site visit – efficiently and cost-effectively.

This is why Emhart Glass has made substantial investments into FlexIS Remote Service by training dedicated engineers and installing a new IT infrastructure exclusively for remote services. This best-practice project was accompanied by an external Remote Service expert team and included selected key customers. The key idea of FlexIS Remote Service is to give you fast access to a FlexIS expert experienced in machine operation, trouble shooting and maintenance. Thanks to a secure internet connection, the FlexIS Remote Service specialist is an expert virtually standing at your side.
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.

After you sign a FlexIS Remote Service contract, Emhart Glass’ sets up a secure and stable data connection between your FlexIS and Emhart Glass Remote Service Center. The costs for this initial setup are borne by Emhart Glass. The yearly flat rate service fee depends on the number of connected FlexIS controlled forming lines and helps to recover the considerable investments and costs of the service.

A comprehensive safety and security concept has been implemented. The secure data connection is blocked at all times by the new Remote Service Platform. Only defined Remote Service specialists with administrator privileges can unblock the data connection. All activities are logged. Any Remote Service interventions are only performed in close cooperation with the responsible person from your organization. FlexIS Remote Service NEVER operates the machine. Control of the equipment always remains with you.

Requesting FlexIS Remote Service is easy: you call Emhart Glass’ and are connected with a FlexIS Remote Service specialist who opens the service call in a new ticket system. Once he gets the approval from you for Remote Service, he establishes the data connection on the new Remote Service Platform. If a Remote Service call requires an additional expert (e.g. engineer) to access the equipment, the Remote Service specialist unblocks the data access for the engineer for a defined period of time. Once the Remote Service call is completed, the data connections of both the Remote Service specialist and the Remote Service engineer are automatically blocked again. You will be able to view your reports as well as selected other equipment documentation by logging on to the Emhart Glass Web Portal.
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