

# Hot end quality control solution

Paul Schreuders presents XPAR Vision's latest Blank Control solution. Comprising the company's Gob Assist and Blank side Temperature Control, Blank Control allows for control of all critical gob loading parameters and temperatures of both materials and parison.

The philosophy behind the Blank Control is that the glass container industry in competition with alternative packaging solutions and in order to respond to increasing customer demands for flexibility/quality/cost and environmental issues (energy/raw materials usage and carbon emissions) has to improve the glass forming process significantly. Factual and repeated measurements of all critical gob loading parameters and temperatures of both materials and parison and the use of these measurements are necessities for this to be realised.

## GOB ASSIST

The Gob Assist comprises a camera module with two optical cameras that moves inside a rail system, attached to the blank side of the IS machine. The camera module moves to all sections. The cameras take images each from an angle at a speed of 500 frames per second from the moment the gob leaves the deflector until the moment the gob has fallen completely into the blank mould, thus capturing the complete gob (see figures 1a and 1b).

The software processes this sequence of images in real time. The images from both cameras are combined to reconstruct a three-dimensional image of the gob, allowing for measurement of the speed, length, position, shape, diameter, time of arrival and trajectory (= orientation) of the falling gobs. With this information, it is possible easily to find and maintain optimal gob loading and to retrieve optimal gob loading after equipment and/or job change.

By use of the Gob Assist, specialists and operators will learn about critical areas in the whole delivery process and how to adjust the delivery system in order to reduce loading variations.

A user-friendly interface allows for the most effective steering on gob loading and thus on controlling and reducing process variations due to gob loading constantly (figure 2).

It can be concluded that Gob Assist is easy to use and will provide more objective, specific and repeatable information than the judgement of a skilled operator who, in fact, can only discriminate between good and bad loading.

## RECOGNISING THE BANANA

What can be seen by the Gob Assist but not by human eye is the banana-shaped gob, which causes poor loading in the blank and results in poor glass distribution (figure 3). The typical root cause of a banana is a worn out deflector, due to non-alignment of the trough to the deflector (figure 4).

Without a Gob Assist, the banana-shaped gob is not recognised as such. Only poor loading and poor glass distribution are recognised. >

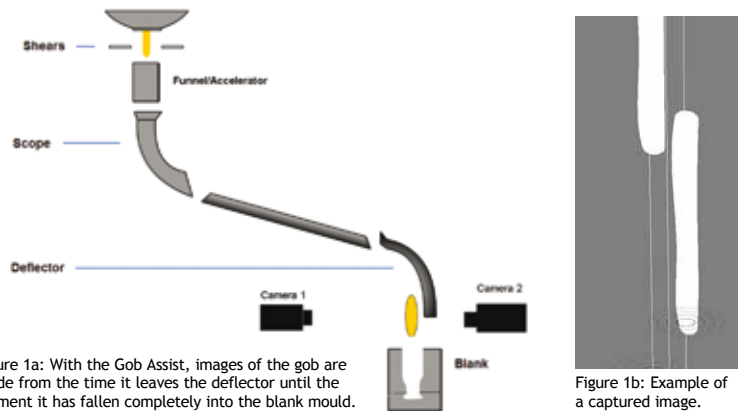


Figure 1a: With the Gob Assist, images of the gob are made from the time it leaves the deflector until the moment it has fallen completely into the blank mould.

Figure 1b: Example of a captured image.

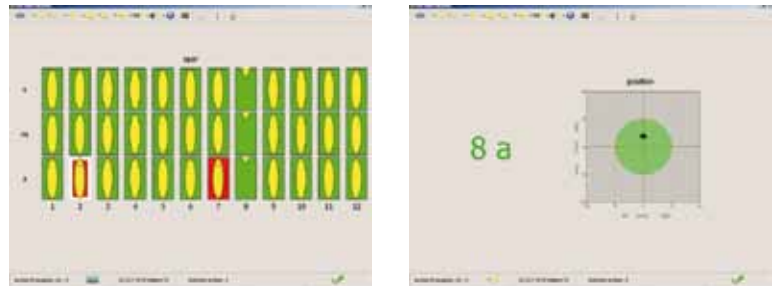


Figure 2: The user interface allows for easy recognition of a problem and easy execution of a remedial action. Left: alarms are given to alert for a problem. Right: keep the gob position within the set target.

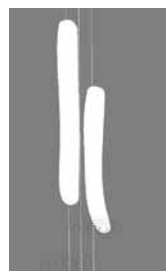


Figure 3: The banana.



Figure 4: Worn out deflector.

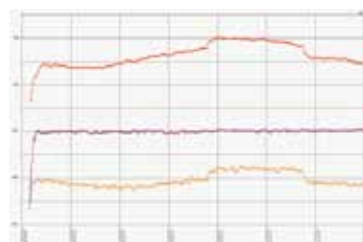


Figure 5: Development of neck ring and plunger temperature in time; a change in plunger temperature (red and orange: bottom and top of the plunger) due to changes of cooling settings. The neck ring (purple) is not affected.

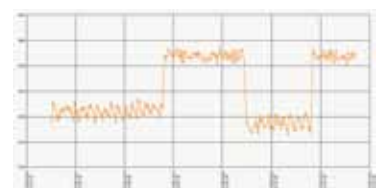


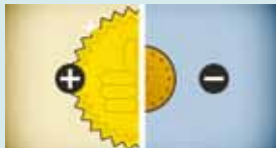
Figure 6: Development of parison temperature in time; a change of parison temperature due to change of contact time.

With a Gob Assist, the banana-shaped gob is recognised immediately and thus effective corrective action can be taken; replacing the deflector and/or adjusting alignment of the trough to the deflector.

**HEADING FOR PERFECTION**



Customers demand more flexibility....



....and higher quality at lower costs.



Lighter, stronger containers produced at higher speed.



Focus on zero defects production.



Enhancing competitiveness against other packaging materials.

XPAR Vision has served the global glass container industry with hot end equipment for inspection and process monitoring based on infrared technology for more than 10 years. Today, its InfraRed Dual camera solution (IR-D) is becoming an industry standard. Experience, continuous customer feedback and the potential for process improvement in the glass container industry drives the company continuously to improve the IR-D and to extend its product range with more solutions for hot end inspection and forming process control.

The current product portfolio comprises the InfraRed Dual camera system (IR-D), Infrared Gob weight Control system (IGC), Gob Assist, Blank side Temperature Control system (BTC), HE Analyser and SQL-based information system (XMIS).

Recently XPAR Vision released a company video, presenting these solutions

for hot end quality control as a logical range. As explained in the presentation, hot end quality control is the answer for the glass container industry to further optimise the forming process in terms of flexibility, quality and costs. The challenge is to produce lighter and stronger containers at higher speed, as such using less energy, reducing emissions and enhancing the competitiveness of glass against alternative packaging materials.

More often the case in other industries, the glass container industry is still a distance away from making defect-free products. Huge amounts of money are invested to create a high level of quality selection at the cold end to meet customer expectations for zero defects delivered. Despite these massive investments, every glass container manufacturer receives complaints from its customers.

To achieve long-term sustainability from different perspectives (customer, economic, environment, competition) it is a necessity to focus on zero defects production at the hot end, where the quality is made. XPAR Vision's philosophy and its range of solutions for hot end quality control presented in the video brings the realisation of this zero defects strategy within reach. Together Heading for Perfection!, the XPAR Vision video, can be seen at [www.xparvision.com](http://www.xparvision.com); the video was produced by [sebasvandenbrink.nl](http://sebasvandenbrink.nl).

**CUSTOMER BENEFITS**

Based on practical customer experience, the benefits of the Gob Assist are numerous. In summary, having a Gob Assist on the line is a guarantee of increased knowhow regarding coating, swabbing, alignment of delivery, shape of deflector and optimal loading. In addition and in many cases even more importantly, the following operational benefits stand: Easy controllable optimal loading; less swabbing; less variations; less section stops; less critical defects; and longer materials lifetime (deflector, troughs and blanks). In summary, increased pack and quality, with reduced operator workload.

Practical customer experience on gob delivery teaches that with Gob Assist, the loading parameter position is easy to control. As the result of a controlled position, the frequency of swabbing has been reduced from three times per hour to once each hour, leaving all parameters/circumstances the same. Also, the number of sections stops has been reduced significantly.

**BLANK SIDE TEMPERATURE CONTROL**

The BTC is an add-on to the Gob Assist that glides inside the same rail system and contains two different temperature sensors. With the BTC, it is possible to perform contactless temperature measurement of both materials and glass at the blank side. Measuring points are simply determined by the user. At the blank side, the gob is transferred into a parison. During this forming process, heat is extracted from the glass to obtain a stable parison, with a good temperature profile. This is a precondition for achieving even glass distribution at the blow side. By measuring temperatures of all components on the blank side (neck ring, plunger, blank halves and parison) consistency of heat transfer from glass to mould components will be achieved.

**CUSTOMER BENEFITS**

The accurate monitoring of temperature conditions at the blank side results in numerous advantages: Valve problems will be visible, plunger tip problems (spikes) will be spotted, cooling set up can be evaluated within a short time, timing difference will be visible in the temperature profiles, mould component designs can be tested for efficiency and the determination of ideal working temperatures for components is possible. As such, the BTC will be the source to create a higher level of sustainability of the forming process at the blank side, without increasing operator workload.

Technically, the BTC has been proven to give measurements of both materials and glass with high accuracy.

**MEASUREMENT EXAMPLES**

Figures 5 and 6 show two measurement examples. Use of the Blank Control will improve the forming process in terms of efficiency and effectiveness by minimising the variation and thus the number of critical defects produced. It is believed that 90% of the bad quality of both forming process and finished product has its root cause at the blank side.

Applying the Blank Control in combination with the XPAR Vision InfraRed Dual camera allows for increasing the level of process control and making an important move towards zero defect production in the hot end (heading for perfection!), while decreasing operator workload. This creates huge possibilities for lighter and stronger containers at higher speed and enhancing the competitiveness of glass container producers with other packaging materials. ■

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