

INC – Individual Needle Control



Increased efficiency in multi-gob operations

INC is the latest update of the GIA – Gob Image Analyser concept that detects disturbances at an early stage in multi-gob operations. Increased capacity and at the same time smaller runs improves process efficiency.

As the glass container consumer demand for special bottles and quality increases, the manufacturing industry must follow and adapt to the combination of increased capacity and at the same time smaller runs. This is met by - among other things - producing in double, triple and sometimes in quad gob operations. Needless to say, it is essential to reach satisfactory pack rate as soon as possible and to keep the job change time to a minimum. In order to meet the latest requirements the well-known GIA – Gob Image Analyser concept has been extended with a number of new functionalities.

These functionalities, with the focus on multi-gob operations, include automatic individual needle control and split weight monitoring and can be used for all types of production processes, i.e. Blow & Blow, Narrow-Neck Press & Blow as well as Press & Blow process.

Individual Needle Control

The main purpose of the individual needle control (INC) is to balance (equalise) gob weights in a multi-gob operation. Today this is often done manually but is perceived as complex and time-consuming. In particular this is true after a job change where split gob situations often occur before the forehearth has settled and glass of uniform temperature is delivered to the glass feeder.

With the INC it is automatically done by using motorised actuators which are connected to the needles a.k.a. plungers on the feeder. The INC automatically calculates the weight differences of the gobs and then makes the necessary correction by sending pulses to the needle actuators.

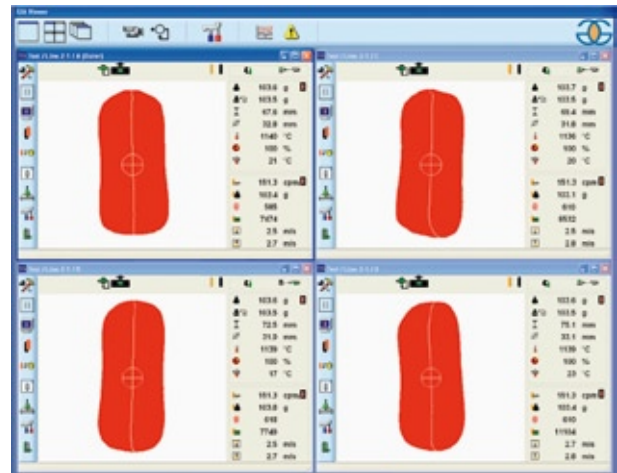
The gobs are monitored by the GIA – Gob Image Analyser and its actual weight is calculated. The Gob Weight Controller of the GIA system then ensures that the weight is maintained stable by automatically moving the tube by sending pulses to the tube-height actuator.

Split Weight Monitoring

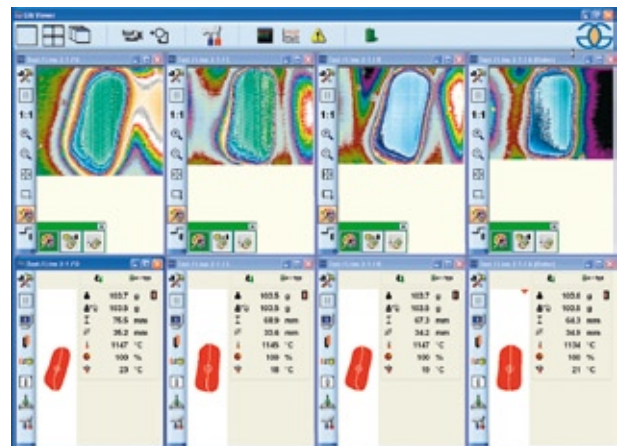
An additional feature of the INC is the Split Weight Monitor (SWM) which continuously monitors the gobs. The weight input is read from the GIA cameras which are optically measuring the gobs. If gob weights diverge and exceed a set tolerance, the SWM will issue an alarm and/or automatically balance the gob weights and then enter gob weight control. The SWM is an effective safeguard for taking care of temporary abnormal behaviour in the feeder; e.g. temperature channelling resulting in split gob weights. By using GIA cameras it is also easier to pinpoint the cause of split weight as this can be done by viewing the gob in a thermographic way.

Implementation

It is recommended to have one camera for each gob in a multi-gob operation in order to track split weights automatically and also to identify the cause of divergence. This recommendation is intended mainly for Narrow-Neck Press & Blow operations and can be relaxed somewhat in a Blow & Blow operation because of the usually accepted wider weight tolerances (and weight differences between the parallel gobs). In such cases a simpler solution with one monitored gob with one camera in a multi-gob operation would be sufficient; the weight control will move the tube and obviously this will affect all gobs.



Max deviation from set point in this installation is around ± 0.2 gram. It is notable that this also applies for the weight differences between the parallel gobs.



The thermographic image of the gobs which indicates that the environment and the gobs influence each other.

Note that even in simpler configurations, balancing of the gobs would be possible since the balancing is done when automatic weight calibration is performed. Of course, this is only possible if the needles are equipped with actuators.

Conclusion

The GIA in combination with the INC and SWM in a multi-gob operation gives the glass manufacturer a higher pack rate as all gobs are weight-controlled and production disturbances can be detected at an early stage. It is the only multi gob weight control system applicable for both Blow & Blow process and Narrow-Neck Press & Blow process. It can either work stand-alone or be interfaced to other needle/plunger controlling systems.