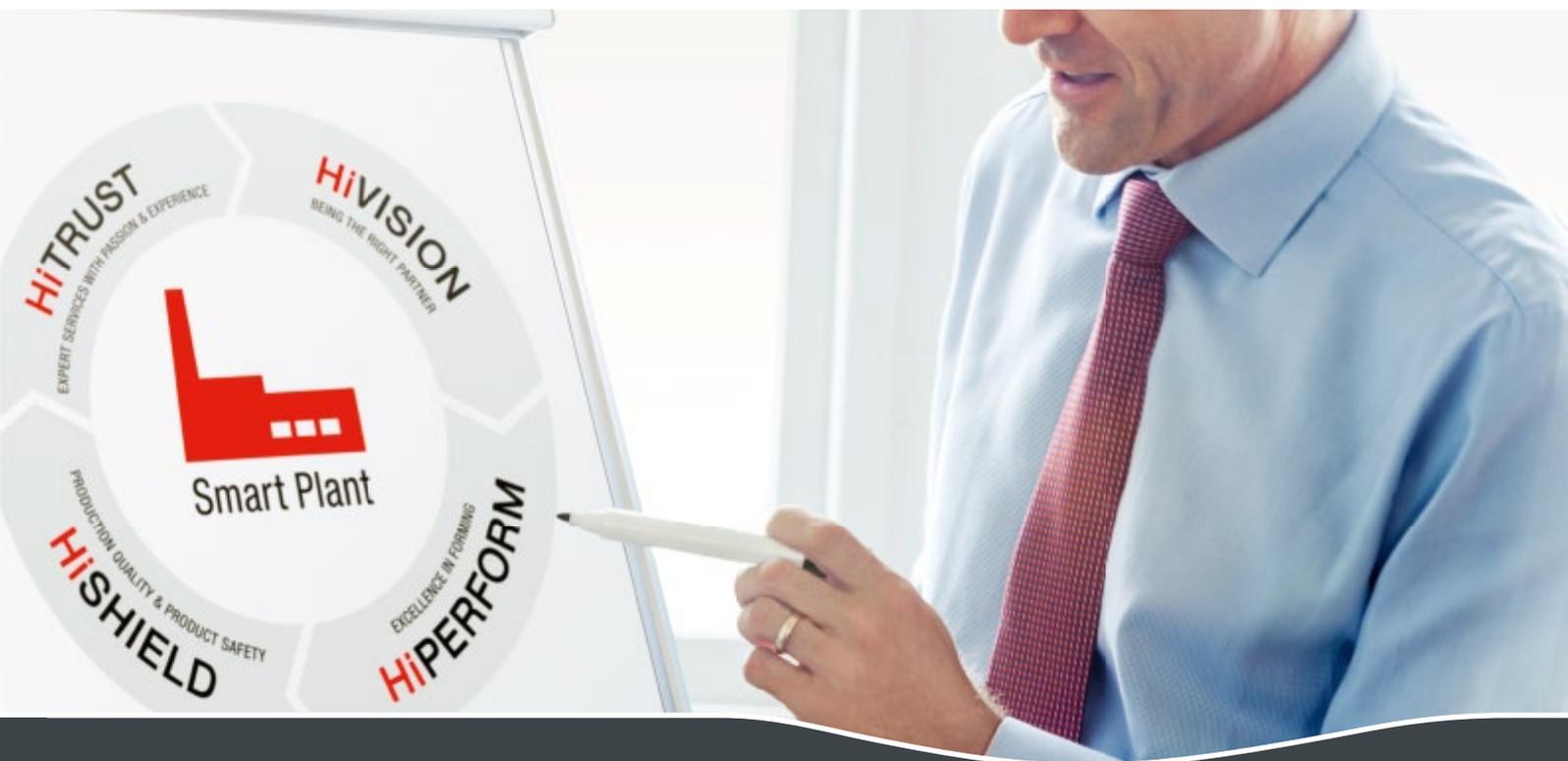
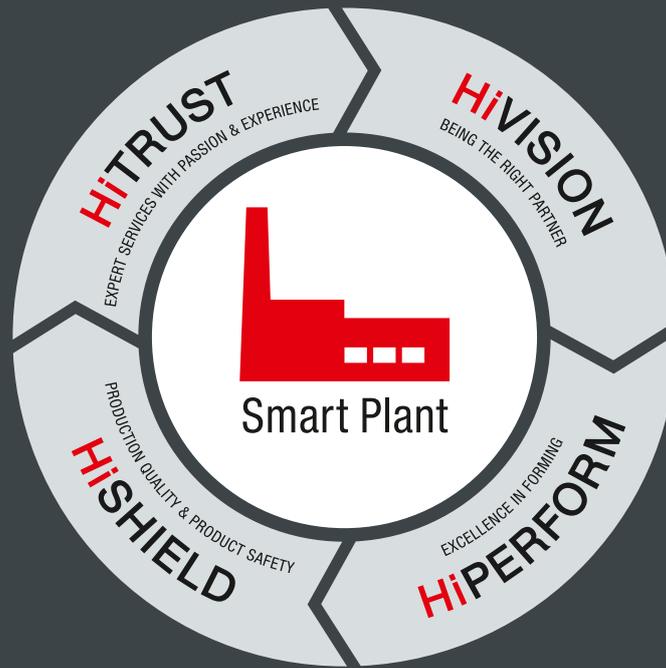


HEYE SMART PLANT



WE ARE GLASS PEOPLE



Heye International is a pioneer in the development of closed loop process control concepts to the attainment of long-term productivity gains in glass container manufacture. The latest Heye automation advances can be integrated with existing technologies to create an effective platform for glassmakers to operate successfully within the framework of Industry 4.0.

HEYE AUTOMATION STRATEGY

Information integration is among the many exciting challenges posed by Industrie 4.0, employing concepts that make extensive use of sensors, the processing of collected data and its intelligent analysis. Experts believe that the fourth industrial revolution could be widely adopted throughout industry within 20 years. Heye International is working to adapt the best concepts to the glass container manufacturing process already today. Reinforcing the company's guiding principle 'We are glass people', the Heye automation strategy and the development of closed loop production concepts, combined with the benefits associated with Heye engineering, training and technical assistance, are helping glassmakers to realise valuable productivity improvements.

SETTING THE CORRECT PRIORITIES

Heye has been one of the industry's pioneers in closed loop control, with many years' experience as a glassmaker, equipment supplier and an important long-term partner. Glassmaking is a demanding process and one that has become increasingly automated. Automation does not come for free, however, making it important to set the correct priorities. Heye has looked specifically at the working steps in which the potential for error is highest or where the greatest savings can be achieved. Following the flow of glass, a series of innovative and proven solutions are offered. Heye's long-term vision, the Smart Glass Plant incorporates dedicated process control technology or the ability to accommodate assortment production, featuring different weights. The technology also includes the availability of swabbing robots, sensor networks, safety concepts (e.g. blow side monitoring) or new servo concepts. The information platform will be the Heye PlantPilot information management system, connecting data from the Hot End and the Cold End.



THE FIRST STEP: SAFE, ERGONOMIC AND CLEAN ENGINEERING

Employing clear engineering design layouts, the company aims to create working environments that are safe, ergonomic and clean. Product quality is addressed by reducing the risk of dirt and particles entering the container. In addition, clearly structured production design makes it easy for employees to operate the different functions correctly and make unnecessary disruptions a thing of the past.

SOFT SKILLS: INFORMATION AND TRAINING

Alongside this highly structured engineering approach, well-trained employees guarantee seamless workflows and provide managers with essential information on existing and potential problems. The Heye PlantPilot as central information tool integrates all relevant data.

Moreover, a properly trained workforce contributes significantly to the attainment of productivity and safety. Experienced Heye International production specialists provide a series of job-specific training courses, either at the company's training centre in Obernkirchen or at the client's facilities.

CLOSED LOOP PROCESS CONTROL

Among the company's closed loop glassmaking process benchmarks is Heye Process Control, which automatically regulates the horizontal and vertical plunger position, as well as the tube height. The result is a constant gob weight. Critical defects are avoided. An optional component of the process control system is Heye Press Duration Control, which keeps the press duration of all cavities constant, provides for equal heat dissipation and ensures repeatable wall thicknesses. Using this system, it is possible to control the individual phases of the pressing process. In conjunction with dual motor shears, the Heye Servo Feeder Mechanism allows stable and precise gob forming. This provides easy parameter settings and pre-selectable profiles to support the operator, resulting in a consistent gob form. The Heye Servo Feeder and Dual Motor Shears allow full production flexibility, where different weights can be made on the same IS-Machine, even when using the NNPB process.

ECOMOTION CUSHIONING

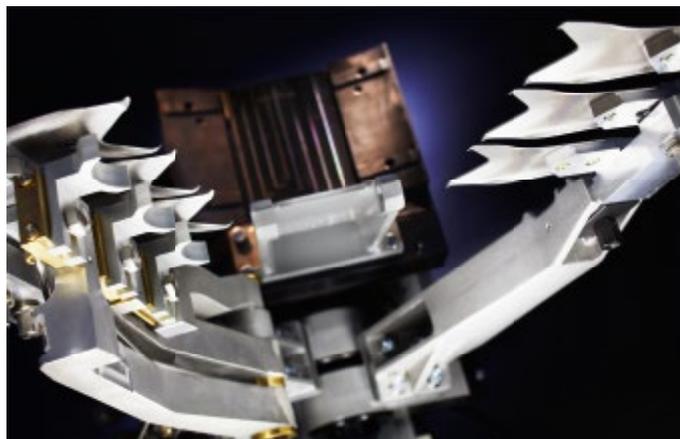
Production efficiency can be increased by implementing a cushioning system of the invert that can reduce the number of critical defects. Heye Ecomotion provides reliable self-regulating end position cushioning. The system is designed to upgrade existing IS-Machines, replacing their safety-critical oil cushioning. Ecomotion achieves the optimal deceleration point of the device by a control system and 'distance-time monitoring' of the entire pneumatic cylinder hub. The software tracks the cushioning performance for documentation purposes. Contrary to CC-cushioned mechanisms, Ecomotion adapts its parameters to new articles after a job change.

HEYE SERVO FEEDER: SUPERIOR THERMAL HOMOGENEITY

Precise gob loading starts at the feeder. Delivering superior thermal homogeneity and top weight consistency, the Heye Rotor Mechanism is another key element of the company's process know-how, having been widely adopted by the international hollow glass community, even by customers not operating the company's IS-Machines. The rotating movement of the rotor segments provides good thermal homogeneity of the glass melt, the equipment's proven design guaranteeing reliable functionality and a long lifetime.

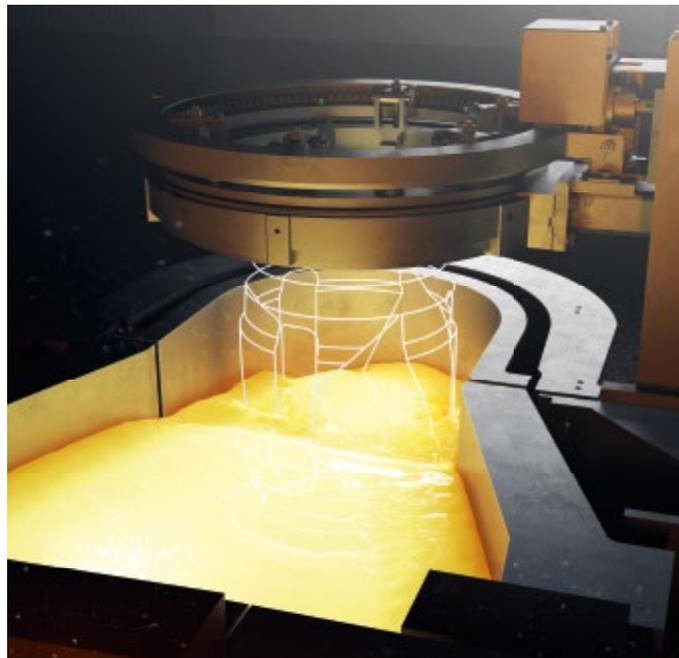
SWABBING ROBOT REPLACES THE MOST CRITICAL MANUAL WORKING STEP

Depending on local conditions, the automatic Heye Swabbing Robot improves productivity by up to two percentage points, through avoiding section stops and minimising container rejects. Up to 75% lubricant savings are possible. The robot sprays into the opened moulds on the blank side. 'Swabbing on the fly' is the key advantage, which means that a section stop is unnecessary. Short spraying cycles with a small amount of lubricant avoid bottles having to be rejected after swabbing. A special programme allows spraying of the neck ring, within the same time an operator swabs the blow moulds by hand.



SAFETY & PREVENTIVE MAINTENANCE: VALVE MONITORING

Manual interference at difficult to access or hot locations of the machines have to be avoided. Heye has employed optional sensors to monitor the final blow valves and to conduct automatic pressure measurement of the entire process stage. The trend monitoring of valve function is a good example of preventative maintenance, providing configurable alarm thresholds and avoiding the need for operators to climb into machines to check the valves' functions. Another option is to use sensors in the dead plate to measure the heat. In the event of abnormal heat radiation, jam-ups of hot glass can be avoided.



CLOSED LOOP WARE HANDLING

To ensure efficient ware spacing and pusher operation at the end of the IS-Machine conveyor, Heye has developed a pusher optimisation solution, where data from a light barrier at the end of the machine belt is delivered to a control unit. The pusher cycle start point is set according to the space between bottles on the belt. Using a Heye Ware Transfer, automatic synchronisation is employed when initiating production, where the fingers of the guide belt go right into the gaps between bottles. The result is smooth article transfer, with no loss of production.

ADVANCED CONCEPTS COMBINED WITH PROVEN SOLUTIONS FOR A SMART PLANT

Collectively, these innovations deliver an advanced smart plant concept. Together with Heye PlantPilot, which integrates plant-wide data, they illustrate the value of closed loop systems and information feedback in 21st century glassmaking.





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