



smart plant

**WE ARE**  
**GLASS**  
**PEOPLE**



# THE SMART ROAD STARTS HERE

Companies in the container glass industry are facing increasing pressure on streamlining cost and efficiency. Their ability to respond to fast-changing market conditions has become a vital factor in achieving entrepreneurial success. Moreover, the industry is faced with an increasing lack of specialists and experience in all areas of the production.

It is therefore of essence that production machines can operate with maximum flexibility, while continuously and autonomously optimising their processes and running thinking procedure that would have otherwise fallen under the operator’s responsibility.

The digitisation of industrial production offers enormous potential to the container glass industry to increase production and capital efficiency. Each product will be traceable in the individual value-added processes down to the raw materials; where each step can be monitored and recorded. This enables us to systematically learn from mistakes, reduce waste and use all resources in an optimal way. The aim is an overall process that checks and improves itself – one which can be reproduced at any time.

However, to be able to use the large data volumes meaningfully, they have to be filtered and edited. Highly qualified experts, who can master this technology and draw the right conclusions are needed to do exactly that.

Apart from simple optimisation of production via networking and active communication in the information triangle of “machine, controlling and human”, the consideration of climate protection requirements and strategies for saving energy are also paramount. The ideas and achievements of global digitisation and Industry 4.0 are therefore vital influences to Heye International’s Smart Road concept, so that we can take part in designing the glass plant of the future.

As a company, and with the strong support of our highly qualified and experienced staff, we will continue to focus on the further development of our full range of expertise. Driving operational excellence and a strong focus on quality and performance remain integral aspects of our operations, despite the very challenging situation the entire supply chain is facing.

Let’s shape the future of the Smart Plant together.



Hans-Peter Müller  
Managing Director

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# PRODUCT MANAGEMENT

## FIT FOR A SMART PLANT

**A Smart Plant requires smart product management. Mark Ziegler, Head of Marketing & Product Management, explains how Heye's approach answers the customer's needs for economical, repeatable, safe and sustainable glass production. The target is to introduce the best product mix to the worldwide customers and get prepared for the upcoming global challenges.**



**Mark Ziegler**  
Head of Marketing  
& Product Management

### WHAT ARE THE MOST SIGNIFICANT TRENDS AFFECTING CUSTOMER DECISIONS?

Digitisation, sustainability and a safe working environment are the three biggest trends affecting our product management strategy. The most frequently asked questions from customers always circle around making production more sustainable, more repeatable, preventing critical defects, preventing machine downtime and doing it all economically. So, it's a balancing act to maximise monitoring of events and close the loops at the best price for value ration.

### HOW IS HEYE RESPONDING TO THOSE TRENDS?

Digitisation is at the heart of Smart Plant. Heye offers a modular variety of sensors to adapt our machines to customer needs. GobMaster and BlankMaster sensors directly influence the most important process parameters through monitoring and subsequent regulation. We integrate the needs and specifications from the industry into our own product strategy in direct customer exchange. And, of course, a plant where more defect-free bottles are produced from every tonne of glass is a more sustainable plant.

### AND WHERE ARE YOU INNOVATING PRODUCTS AND PROCESSES AHEAD OF CUSTOMER DEMANDS?

With every product we bring to market, we keep an eye on future requirements. For example, a sensor which automatically takes the temperature from the blank mould is helpful for daily

measurements and statistics, but the control loop that can result from these measurements brings true added value for automation and repetitive success. Based on the fact that Heye has been providing forming and inspection solutions for decades, its knowledge of process and production optimisation benefits all customers, who get even more than they expect.

### HOW CLOSE DO YOU THINK WE ARE TO A 100% AUTOMATED FACTORY FLOOR?

We're not there yet. Let's split the degree of automation into five, where level 0 is no automation and level 5 is 100% automation. I'd say we are somewhere in the middle between partial automation, where some tasks are automated, and conditional automation, where all standard tasks are automated. For instance, some common workloads are already automated, like swabbing by the Heye BlankSideRobot, but others still need to be done by the operator. Coincidentally, robotic swabbing reduces lubricant use by around 75%.

### YOU'VE MENTIONED SUSTAINABILITY A FEW TIMES. HOW DO IDEAS LIKE PLANNED MAINTENANCE PROMOTE GREATER CIRCULARITY AND LONGER LIFE?

Modern glass container production is more than just using modern forming equipment. Sustainable production is determined by how effectively all the stages of the process work and fit together. Predictive and preventative maintenance are hugely successful

in other industries like automotive. Its main objective is to secure machine availability so there are no unplanned breakdowns both at the overall machine and the section level.

### WHAT'S NEXT FOR YOU AND YOUR TEAM?

We are fortunate to have a dynamic team in product management and all product related departments ready to face the challenges

of the future. Internally, we are improving the way we define our structure and processes, then we can better implement our plans. We are Glass People from the beginning. Hence, these plans are controlled by being closer to our customers and ahead of the technical opportunities available to make glass as efficiently and sustainably as we possibly can.

# HEYE'S R&D AGENDA

**Dr. Michael Kellner, development engineer at Heye International, talks about digitisation, emissions and artificial intelligence.**



**Dr Michael Kellner**  
Head of Product Development  
Digital Systems

Dr. Michael Kellner was born in Jena and has already come into contact with glass as a student through an internship at Schott Glas. "Glass - that's what it exactly should be" he says in retrospect, having studied building materials and process engineering with a focus on glass in Weimar. As early as 1986, he was involved with the first image processing cameras and their use for inspecting glass. "The theory was there, but the technology was not yet powerful enough for the glass industry," he says. During his doctorate on automation and image processing technology in glass production, Michael Kellner began working at Schott Glas. After the doctorate, he started as a trainee at the former company Heye-Glas, a very innovative, medium-sized enterprise. Initially, he was the link between production and development for introducing automation solutions in glass production. In 1992, he was responsible for testing the first image processing applications based on image processors at Heye, and shortly afterwards he began to develop PC-based image processing solutions. "Experts at the time thought that image processing could never work with a PC," says Kellner. "What a mistake". The "process engineer" with a doctorate leaves the company in 2000, but returns to Heye in 2006 as head of development. Since 2019, he has been responsible for the development of digital systems.

### DIGITISATION AND INDUSTRY 4.0 ARE CURRENTLY MAJOR TOPICS. SINCE WHEN HAVE YOU BEEN DEALING WITH IT?

DR. MICHAEL KELLNER: Digitisation is not a new field at Heye. At the beginning of the 1990s, we introduced a PC parameterizable, electronic timing system for controlling the IS-machines and the Hot End reject system, including the evaluation of pushing glass containers from the dead plate onto the machine conveyor by means of pushers. The complete Hot End process was converted to servo technology, i.e. from gob forming to ware handling. This was a huge step into the future, as the motion sequences were now matched and followed by the feedback generators according to the given motion curves. Shortly afterwards, the first servo motors were also used in the IS-machine to make critical process sequences reproducible and to avoid container defects. An important component in light glass production is certainly the introduction of the Heye Process Control, which digitally records and visualizes the pressing process by recording the plunger positions. In 1998, Heye worked on a Hot End gob camera for recording the cut of gobs. But the resolution of the cameras and the performance of the PCs was not sufficient enough. Nevertheless, the experiences gained were extremely important in order to build up the skills for the following years. When the first grabber cards were available, the new Terra computers were bought and a camera-based mould number reader and a camera-based sealing surface tester were developed.

## WHAT IS THE STATE OF AFFAIRS AT HEYE INTERNATIONAL?

We have converted complete machine platforms because the market has tended to triple and quadruple gob operation. Consequently, we made all the Hot End equipment “fit for the future”. Today we offer the complete technology platform for all applications. We are on the right track. The further development of sensors and actuators has created new opportunities. Since the introduction of industry 4.0, we are raising the bar higher and higher. For example, the new IS-machine, namely the “Heye SpeedLine” we have developed. The SpeedLine IS-machine is the first machine that is fully bus capable. The next development goal was to create areas in the IS-machine where sensors, actuators, the necessary cables and the processor technology could be installed safely and reliably. Safe and reliable means, in this context, protection against heat, oils, oil vapours, water, water vapour, dirt and glass. We have succeeded very well with the SpeedLine because we have conceived the design differently. The cable routing was first designed and it was tested, where the sensors must be mounted and how we can technically protect them to ensure long-term stability. Operating sensors without failure in a 1,000° C hot environment is not so easy. Thanks to the bus system, all systems in the machine are networked together and a large number of sensors can be managed. This naturally brings with it new possibilities and products, for example the intelligent lubrication interval control - the “Heye Multi-Circuit Central Lubrication” - which significantly saves oil and increases the lifetime of the components. Also the inline measurement of pressures and temperatures of the equipment should only be mentioned here. With this machine, we have taken a giant step into digitisation. There is now a “Communication Tower” that combines all network components, computers and servers in one cabinet. The components are interconnected and communicate with each other. SpeedLine is a platform technology in which components such as robots or measuring and control systems can be integrated very easily. Via the Communication Tower there is also a gateway to the outside, i.e. to the customer. The Application Programmable Interface “Heye SmartLink” provides the customer with the data of the manufacturing process for individual data analysis.

## DO YOU DO EVERYTHING YOURSELF AT HEYE? FOR EXAMPLE, PROGRAMMING?

Most of the software is developed by us, especially in the key technical areas. The hollow glass industry is a relatively small and very special market segment. It is difficult to explain the processes to external companies. There are a few components that we buy, such as sensors, for example. However, the suppliers then work for the glass industry in the long term and are therefore aware of the requirements.

## THE REDUCTION OF CO2 EMISSIONS IS A FIELD THAT WILL ACCOMPANY US MORE THAN EVER IN THE COMING

## YEARS. WHAT CONTRIBUTION CAN THE CONTAINER GLASS INDUSTRY MAKE?

It is probably the most topical issue at the moment: CO2 footprint or decarbonisation. If you look at the side of energy consumption and leave the compensation models aside, then it is essentially about the sensible use of energy and the avoidance of energy waste. For us as a machine manufacturer, two different directions are relevant when it comes to emissions. On the one hand, it is a matter of minimizing losses, which means producing as much as 100 per cent of the glass bottles possibly without defects. Then you don't have to throw away glass bottles, don't waste the energy needed to make them and have a better CO2 footprint. On the other hand, the focus is on equipment availability. It is best to operate the machine 24/7 and produce glass bottles without any defects. This also includes minimized job change times. To avoid emissions, it is important that errors are found and eliminated as soon as possible. This is why it is so important to reduce the gap between Cold End information gathering and Hot End information processing. This results in a significant improvement in equipment availability and an increase in yield by reducing transport and quality losses. Efficiency increase and CO2 reduction are therefore closely related.

## THEN, IDEALLY, THE MEASUREMENTS WOULD HAVE TO TAKE PLACE AT THE HOT END?

Exactly! This is not so easy, however, because many of these measurements are contacting measurements. And when I contact a hot bottle with a measuring tool, it deforms and becomes unusable. We still do not have a solution to how it might work to turn a hot bottle and, for example, to measure the wall thickness. That is not realistic at the moment. Today, we want to measure the parameters of the forming process directly and keep them constant within narrow limits. We use infrared cameras at the Hot End to identify deviations in the process more quickly and, above all, not to exceed or fall below the limits and to take countermeasures immediately. This technology is called “Hot End Closed Loop”. Ideally, non-contact sensors control and regulate the process.

## WHICH CONTROL LOOPS DO YOU MEAN?

Different sensors are also used at different locations for the different process sections. They are then used to influence parameters of the gob, the parison or the bottle. If you start with the gob forming, you use a gob camera to adjust and control the gob shape and gob weight. Also, the gob temperatures can be measured to influence the spout temperature in the feeder. On the blank side, the gob delivery into the blank mould can be detected and adjusted. The tool temperatures on the blank side (blank mould, neck ring and plunger) can also be measured and controlled. Infrared cameras on the machine conveyor are already frequently used today to measure wall thickness distribution and detect global

errors. Optical cameras are planned on the machine conveyor for measuring and controlling the container geometry and for detecting glass defects.

## AND AT THE COLD END?

The manufacturing process is completed when the glass container passes the annealing Lehr. The Cold End does not deal with controlling the process. However, what should be mentioned, is to check automatically whether the inspection machines are set correctly by using sample containers. However, downstream processes, such as printing or surface treatments for increasing the strength, can also be measured and controlled.

## WHAT ROLE DO THE WEIGHT AND SHAPE OF THE GLASS BOTTLE PLAY?

In the 1990s, a price war broke out for disposable packaging. In order to save on raw material, energy and transport costs and also to reduce the charges to the dual system for disposable bulk items, projects have been launched to reduce the weight of glass containers – that means, to produce with thinner wall thickness. Heye has a very big advantage with its experience from H1-2 technology and was able to transfer this to IS-machine technology. A relic of these times is the famous Paderborner beer bottle. It was shown that the shape has an immense influence on the weight of the container while maintaining its strength. Today, a compromise is sought between an individual bottle shape, volume and weight with sufficient strength. If we want to become more ecological, then we will have to compromise on the individual bottle shape in favour of the container weight. Many machine components and HI products, which were already developed for light glass technology at the time, are now standard in industry. Starting with the “Process Control”, through axial cooling and hot end transport – all of them components that can be used with know-how for the production of lightweight containers.

## LIGHTWEIGHT GLASS PRODUCTION SEEMS TO BE A BIG CHALLENGE.

The characteristic of simple light glass is that it breaks very quickly. You can fix this problem with thermal or chemical post-processing, but it will increase unit costs. No one would probably pay a deposit of several Euros for a gorilla milk glass bottle. For the future, a technology must be developed that is based on the current hollow glass production and is efficient. Anyone who manages to increase and maintain the glass surface strength in the production of lightweight glass will be at the forefront in the future.

## WHERE DO YOU SEE FURTHER EMISSION SAVINGS POTENTIAL?

I see the big emission savings in the glass industry globally in the recycling of cullet from the market (waste glass collection and processing), because for a glass bottle production from cullet, much less energy is needed than for a production from raw materials. Energy savings through heat recovery from the forming processes and in the annealing Lehr have further potential. The ecological approach follows the economic approach: If you save energy, you also save money. This is a strong incentive. The biggest cost factor in glass production is energy.

## HEYE MACHINES ARE IN USE WORLDWIDE. REMOTE ACCESS AND REMOTE MAINTENANCE ARE BECOMING MORE AND MORE IMPORTANT. WHAT DO YOU NEED TO TAKE INTO ACCOUNT?

For remote access via the Internet, it is essential to consider security. Cyber criminals are lurking everywhere, and so companies are sealing themselves off more and more. This means that service providers cannot get into the company networks to connect to the machine and provide support from there without considerable effort. Solutions must be found in consultation with the IT departments of the customers.

## HOW DO YOU ASSESS THE POTENTIAL OF ARTIFICIAL INTELLIGENCE FOR THE GLASS INDUSTRY?

AI is currently high on the agenda. I am now in the third wave: The first was in the 1980s, the second in the 1990s and the third is rolling now. You can certainly do a lot with artificial intelligence. But, you have to keep the boundaries in mind: Artificial intelligence is determined on the basis of learned information from the past. In order to learn a corresponding neural network, a large number of good and bad example objects are needed – we talk about 500 to 5,000 information. Gaining and learning these examples is a huge effort. And when new objects appear, the neural network cannot begin with them. There are AI applications, the decision is already working very well. In the glass industry, on the other hand, this only works for simple applications, such as reading mould numbers in the seven-segment code. Glass defects, on the other hand, become more difficult because they always look different. If new information is added that the trained system does not know, AI will not get any further. There are basically no two exactly the same checks. Perhaps a combination of imaging processes and neural networks can help, but that is still a dream for the future.



# FULL SUPPORTED PARTNERSHIP FOR A SMART PLANT

**Heye International appointed Hans-Peter Müller as Managing Director earlier this year. He outlines his vision for the company and how digital technology will remain at the forefront of its portfolio.**

## HOW EXCITED ARE YOU TO BE APPOINTED AS MD AT HEYE INTERNATIONAL?

Thank you. After some months in the role and having had the opportunity to develop a good understanding of our market, our business model and our capabilities, I am indeed very excited to have joined the Heye International team, who have greatly impressed me with their dedication, their knowledge and experience. I am confident that Heye is well positioned to achieve further success, to address our industry challenges and to continue to grow our customer base, our service network and our product portfolio.

## WHAT WAS IT ABOUT THE ROLE THAT APPEALED TO YOU?

I was at a stage in my career where I was ready for a new challenge. When I looked at Heye's portfolio, and the developments and opportunities in the glass industry, I saw the possibility to contribute to new ideas and support further progress in the sector. Heye International provides technical support and solutions to its customers and has a lot of new ideas and innovations in the pipeline, which I am committed to supporting to commercial development.

## YOU WERE MOST RECENTLY MANAGING DIRECTOR AT DIETRICH PROCESS SYSTEMS. WHAT SKILLS AND EXPERIENCE WILL YOU BRING FROM THIS ROLE TO HEYE?

In my former role, I had global responsibility for a business line. I had the opportunity to adapt the existing organisation to future market requirements and opportunities. This included the

development of new business models and strategies to cover market cycles, looking at new and enhanced applications and solutions as well as implementing a greater focus on innovation processes and development projects.

## DO YOU ENJOY BEING A LEADER? WHAT IS YOUR LEADERSHIP STYLE?

Yes, I do, and I enjoy working with my team. I try to be clear and consistent about my expectations and combine this with open and honest feedback. I trust in people and their abilities and believe in empowering my team to take ownership and accountability. Every employee has an important role to play in achieving our objectives and reaching our targets, my door is always open whenever support is needed. As a leader I strive to build a positive culture, in an environment where my team feel empowered. In this way, we can best work together, to bring new solutions to our customers.

## CAN YOU GIVE AN INDICATION OF WHAT IS YOUR VISION FOR HEYE UNDER YOUR LEADERSHIP?

The main target for the coming years for Heye is to further enhance our position as the technological leader in our sector. This requires a focus on structured innovation in our development process, and increased efficiency in manufacturing, including shorter throughput times and optimised capacity. We will also focus on strengthening our global presence and improving our capabilities to provide local service and support, as well as attracting and retaining young talent.



**Hans-Peter Müller** *Managing Director*

## WHAT IS THE BIGGEST CHALLENGE FACING HEYE?

After a challenging period through Covid 19, where our employees demonstrated a high level of commitment and discipline, we are now, like many other companies, facing major challenges in the supply chain. This not only means significant price variations and longer delivery times, but it also requires flexibility and creativity in finding alternative solutions and sources. A particular area of concern is the lack of skilled labour, especially in the technical functions. This, in line with ongoing demographic change, however, this serves to focus us on attracting and recruiting new technical talent which is crucial to our future success.

## WE HAVE SEEN THE EXPANSION OF DIGITAL TECHNOLOGY IN RECENT YEARS IN GLASS MANUFACTURING. HEYE HAS BEEN AT THE FOREFRONT OF THIS. HOW WOULD YOU LIKE THE COMPANY TO EXPAND ITS DIGITAL OFFERING?

The big target is certainly to make better links between the hot and cold end of the process and to develop machines which are smart enough to learn from and avoid defects, by predicting them and taking preventive actions. The vision is an intelligent and completely closed machine with very limited operator input, which is self-learning and can independently set itself up. Digital technology will also help to further reduce the consumption of raw materials, energy and will help to further improve the sustainability of glass packaging.

## WHAT BENEFITS DOES DIGITAL TECHNOLOGY BRING TO THE INDUSTRY?

Today, boosting efficiency is a key challenge in the glass production sector. To optimise both costs and performance factors such as PTM (pack to melt) or mould life, an overview of all relevant production data is needed. Our system gives a complete overview of production performance. The data collected includes diverse inputs, including from the laboratory, the article counter, the inspection machines, the IS-machines, together without input from the operator. We offer our customers a fully supported partnership on their individual path towards a smart plant, resulting in the creation of a highly automated and cost-effective glassworks.

# SMART PLANT CONCEPT

**Adoption of the latest technologies is now crucial for the international glass container industry. Glass is constantly under pressure from other packaging materials, while attracting skilled people to work at the industry's factories is an increasing challenge. Heye offers customers a partnership on their individual path towards a smart plant, resulting in the creation of a highly automated and cost-effective glassworks.**

## SELECTION IS KEY

Selection is key to defining the perfect path but some decision makers are still confused by the issues surrounding Industry 4.0 technologies. Combined with rising CAPEX challenges, this makes it absolutely necessary for plants to identify a partner when it comes to the selection of appropriate technology. Not everything that is possible makes economic sense for a glass container plant. The Glass People at Heye combine long-term process expertise and a passion for the material, with advanced skills in the latest technology. Every possible solution is evaluated by the company's process experts, based on the decision criteria of financial ROI, workplace safety and influence on product quality.

## SMART USER INTERFACES

The availability of smart user interfaces for operators has become especially important, as production employees with comprehensive process knowledge are increasingly difficult to find. The Heye Cockpit will become the central user access to the Heye SpeedMaster Hot End control and process intelligence portfolio. The Heye SpeedMaster consists of three modules: E-timing; motion control (servo and pneumatic actuators); and the process intelligence solution set, combining all process control closed loops.

## EASY OPERATION

The approach employed is user-centric. The cockpit integrates all relevant sub-systems at the Hot End. Features like the integrated article database make job changes as easy as possible.

Combined with precise mechanisms, the latest servo technology helps to achieve maximum production speed at high quality levels, especially for large beer lines etc. High production flexibility is another result of the technology.

Glass plants with small customers and many different jobs have two advantages. First, job changes can be performed in a very short time, as important parameters will be retrieved and the major parts of the machinery will be adjusted automatically in the future. Second, the operators can produce different bottles on one IS-machine, by using multi-weight assortment technology. This makes the production of samples or short job runs extremely efficient.



## PROCESS CONTROL AND CLOSED LOOP SOLUTION SET

As well as being the inventor of the NNPB process, Heye has set the standard in closed loop production technology. A large set of closed loop solutions gives the customer a competitive edge. Heye offers operator assistance for gob loading and closed loops for gob form and weight.

Following the glass flow, on the blank side, closed loops for cooling and press duration/glass distribution are available. The swabbing robot eliminates one of the most important manual working steps, at the same time being the basis for precise, infrared-based temperature measurement on the blank side. Closed loops on the blow side allow accurate, high speed ware handling. Dead plate cooling is controlled, creating the basis for proper bottle movement through the high speed pushers, while the closed loop for ware spacing is a second speed-relevant factor. Furthermore, both loops eliminate defects generated by a wrong ware handling set-up. Many of these solutions are already available, while others are in the prototype phase. In some areas, operator assistance is a good first step and in other areas, full closed loop systems are already in place.

## CONNECTING THE HOT END AND COLD END

By using internet-based technology, different machines or modules can be connected to manage the plant. In addition, important analysis possibilities are offered to optimise the production process. Data integration between Hot End and Cold End helps especially to gain time. Via the Heye Cockpit, the Hot End operator has a perfect overview of the defect situation on the different cavities. By a future extension of the database to an expert system, recommendations for the correction of production defects can be given. As production companies have more and more challenges to find skilled people, these expert systems for glass forming will become an important success factor.

## SUMMARY

In summary, the Heye smart plant concept combines different innovative solutions in major areas. All of them have become possible through a set of enabling technologies, from sensors and communication networks to robots. The Heye Glass People are the correct partners to develop a common roadmap for the journey to a smart plant, a factory that will be able to produce high productivity containers at low cost, resource-efficiently and with a consistently high quality.



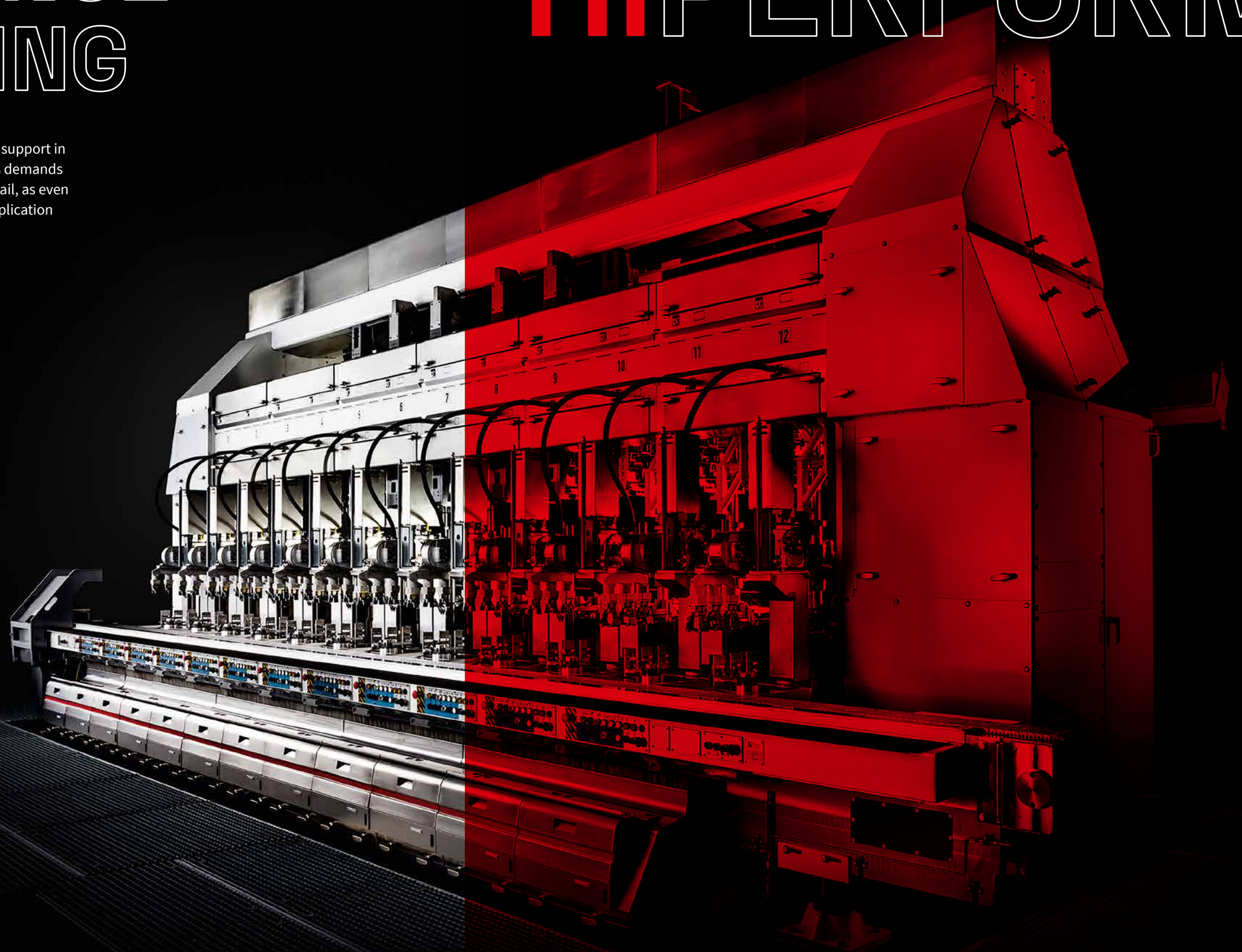
# EXCELLENCE IN FORMING

**HiPERFORM** is synonymous with excellent equipment and support in container forming. Every stage of the glass forming process demands meticulous attention to detail. Heye takes care of every detail, as even minor variations in manufacturing techniques and their application have a huge impact on production performance.

The Heye SpeedLine Hot End portfolio covers the production process from feeder tolehr loader:

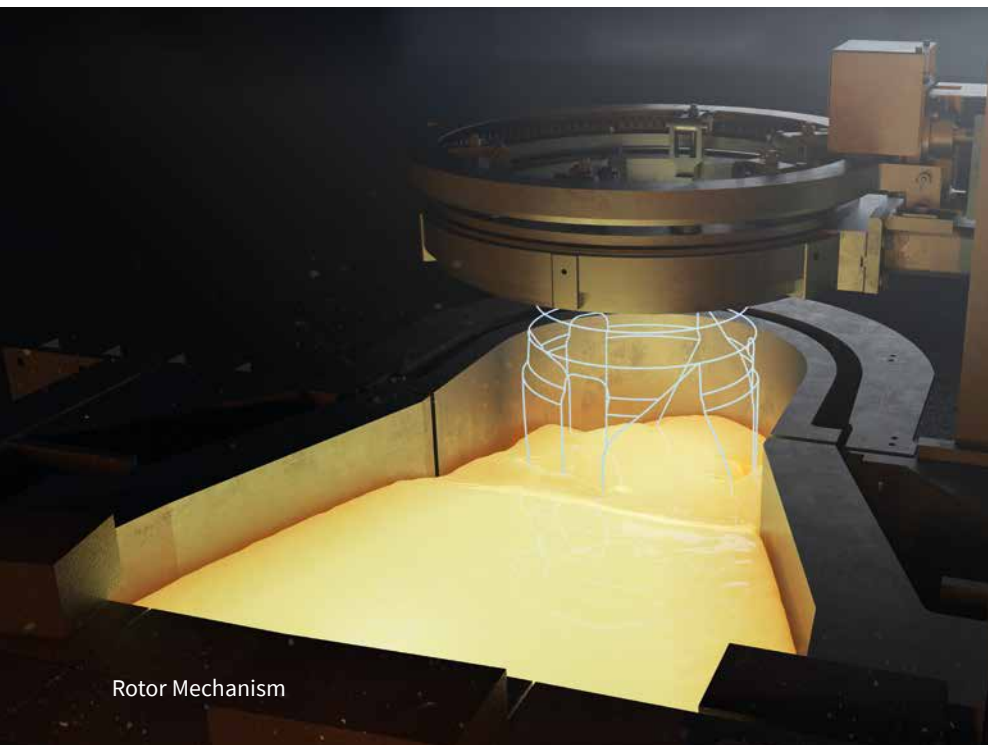
- + HEYE SERVO FEEDER FOR PRECISE GOB FORMING AND MULTI-WEIGHT OPTION
- + SPEEDLINE IS-MACHINES WITH INTELLIGENT INDUSTRY 4.0 OPTIONS
- + DUAL MOTOR SHEARS AS MARKET STANDARD IN LIFETIME AND LONG SERVICE INTERVALS
- + PRECISE WARE HANDLING FOR HIGH SPEED PRODUCTIONS

# HiPERFORM





# GOB FORMING



Rotor Mechanism

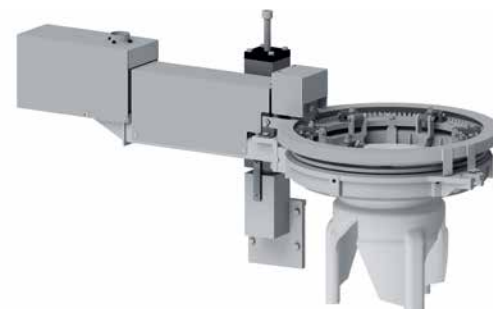
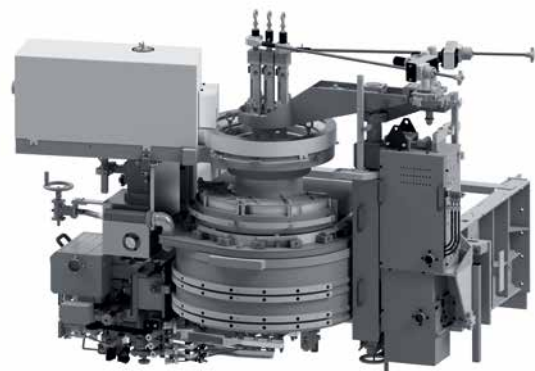
Heye International sets the benchmark in gob forming. Latest Siemens servo technology is combined with process intelligence and precise assembly of the equipment. Multi gob weight/ assortment production can be integrated to increase flexibility in production. Precision, ease of use and low maintenance costs are standard. Heye offers feeders for small, medium and large productions up to 200 tpd. Depending on the size and configuration, productions from single to quad gob are possible.

## Superior thermal homogeneity and weight constancy

### HEYE ROTOR MECHANISM – THE ULTIMATE STANDARD FOR NNPB

The Heye Rotor Mechanism for superior thermal homogeneity and weight constancy has become the standard equipment in many large container glass groups. Especially for NNPB productions the precise weight constancy is a unique advantage. The design is

robust. By a rotating movement of the toothed ring, three paddles provide for a stirring movement in the glass mass and thus keep it extremely homogeneous.



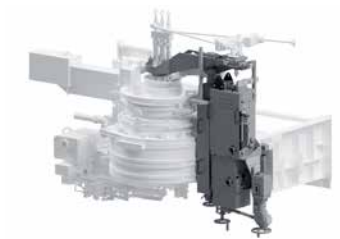
### ROTATING TUBE MECHANISM

The mechanical design of the tube mechanism provides for high running smoothness and exact alignment of the tube above the center of the gob. The height adjustment benefits from the wellproven technology of the Heye Servo Plunger. The combination of a stable guiding with low-backlash threaded spindle drive provides for an exact and reproducible movement of the tube. For NNPB applications, the height adjustment is controlled by the Heye Process Control during run. Manual adjustment is possible by means of an adjusting rod.



### SERVO PLUNGER

The reliable and precise Heye Servo Plunger is characterised by a servo motor driven spindle. The carriage transfers the stroke movement without any bending- and transverse force onto the plunger tube. To compensate the gravity forces, a pneumatic cylinder takes effect to the carriage. Stroke alterations through the whole stroke range of 170mm do not require any changes at mechanisms.



### HEYE SPRAY SYSTEM

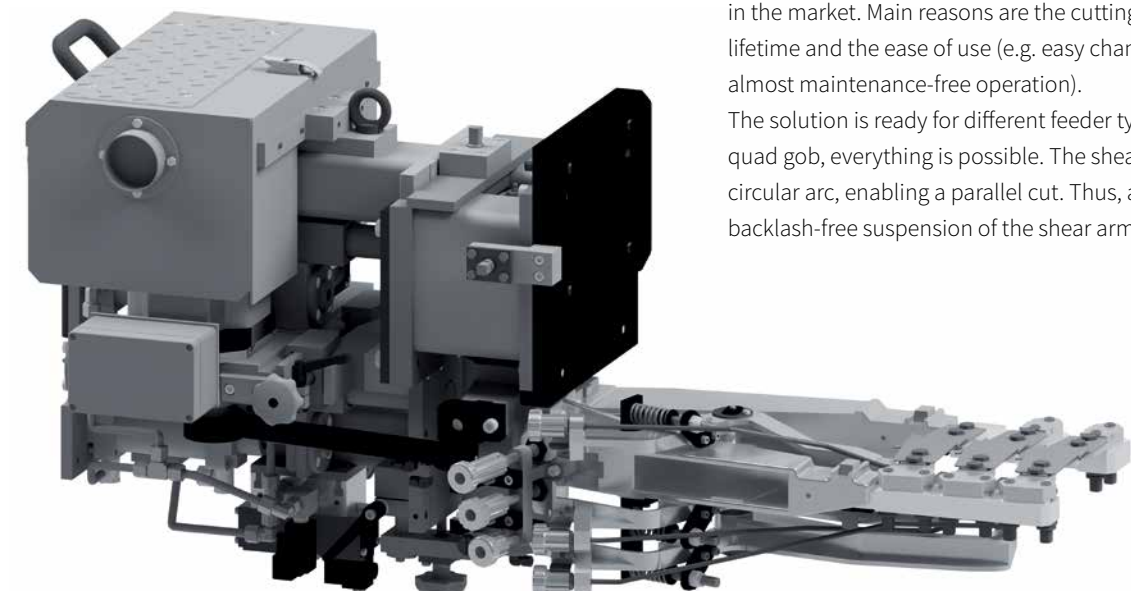
It is possible to integrate the spray system into the SpeedLine. By the use of dosing pumps, it sprays finest spray mist on the shear blades and scoops. This ensures a reproducible gob loading, strong cooling effects and wear reduction. The shear blades and the gob distributor funnel are continuously sprayed via appropriate spraying bars with a mixture consisting of treated water, compressed air and additives.



### DUAL MOTOR SHEARS

The dual servo shears mechanism is one of Heye's top sellers in the market. Main reasons are the cutting precision, the long lifetime and the ease of use (e.g. easy change of shear blades, almost maintenance-free operation).

The solution is ready for different feeder types. From single to quad gob, everything is possible. The shear blades move on a circular arc, enabling a parallel cut. Thus, a nearly wear- and backlash-free suspension of the shear arms is realised.





# HIGH FLEXIBILITY

**MULTI-WEIGHT FEEDER — ASSORTMENT PRODUCTION**



Using the smart servo concept for plunger and the dual motor shears, gobs of different weights can be produced on a single IS-machine – also in NNPB. What sets the Heye International solution apart from others is that every gob is used and no energy is wasted. Handling and operation are very easy due to the smart servo solution.

- + SAMPLINGS EASY TO MANAGE
- + LESS DOWNTIME TO RECONFIGURE THE IS-MACHINE
- + DIFFERENT JOBS PER MACHINE
- + FEWER MACHINE-WIDE JOB CHANGES
- + FEWER MOULDS FOR EACH LOW-VOLUME ARTICLE





# AUTOMATIC SWABBING

## PROVIDES HIGHER PRODUCT QUALITY AND EFFICIENCY

This new robot is impressive with its compact design, which means that no additional control cabinets are required. The complete control is integrated in the robot itself and in the set-up station. In addition, Heye engineers have also given thought to the oil supply. The main focus here was to give priority to short distances for the oil supply. The reservoir for the oil, including an oil level indicator, is located in the robot cage. Short pipes reduce the risk of sedimentation, supporting a focus on the ecological impact. The user can refill lubricant at any time through a special service opening. Depending on local conditions, as well as the production process and container type, many advantages can be realised:

- + ZERO REJECTS FROM SWABBING
- + AVOIDANCE OF SECTION STOPS
- + UP TO 75 % SAVING ON LUBRICATION
- + IMPROVED OPERATOR SAFETY
- + STABLE AND REPEATABLE VOLUME, THICKNESS AND LOCATION OF SWABBING LUBRICANT
- + CONSEQUENTLY, MORE TIME IS AVAILABLE FOR OPERATORS TO FOCUS ON PRODUCTION OPTIMIZATION
- + INNOVATIVE AUTOMATION SOLUTIONS AND CLOSED LOOPS TO REDUCE MANUAL OPERATOR INTERFERENCE



Robot with Safety Cage

## Operating principle

The robot runs on a rail in the overhead beam. This means that the floor is free from obstructions and mould changes can be performed without any interference from the robot. All new Heye IS-Machines are prepared for the installation of the robot. Due to the excellent control of force from the robot into the overhead beam, there is a low susceptibility to vibration. The robot sprays into the opened moulds on the blank side. "Swabbing on the fly" is the key advantage, which means that a production stop is unnecessary. Short spraying cycles with a small amount of lubricant results in avoidance of any need to reject bottles after swabbing. A special program allows spraying of the neck ring, within the same time an operator swabs the blow moulds by hand.

### WHAT'S NEW ABOUT THE BLANKSIDEROBOT?

The first thing that catches the eye is the new compact design with the integrated LED strips. The direction of travel, oil level, general operating status, operating mode and countdown to the start of the robot are displayed by the LEDs. Particular attention was paid to both safety of the system and safety of the user personnel. When it comes to system safety, the focus is on collision prevention/detection (between robot and invert) and a non-destructive tool.

The first stage is collision avoidance. The SpeedLine's invert mechanism stops as soon as the lubrication robot is in the collision area. The second stage is collision detection. If a collision does occur, the station is automatically stopped to prevent further damage. The third stage is the use of a "nondestructive" lubrication tool. Heye International uses a breakaway magnetic coupling. If there is actual contact between the invert and the

lubricating head, the front part of the tool detaches from a magnetic coupling on the lubricating tool. A catch rope, similar to the rims in Formula 1, prevents the lubricating tool from falling uncontrolled into the machine. Simple and clever.

### INTEGRATION INTO SPEEDLINE IS MACHINE

In order to be able to use all the features, a SpeedLine IS machine with HMST/FMT control and servo invert mechanism is required. The integration into an on-site machine is easy. Only four electrical lines (1x power supply, 3x data lines) and a compressed air line are required. There are also a few mechanical adjustments to the existing SpeedLine IS machine. The signals are transmitted via CanBus and Profinet. This innovative solution is suitable for all production processes (Blow & Blow, Press & Blow and NNPB) as well as for round and non-round goods in any glass colour.





# SPEEDLINE CONCEPT

Experts recognize Industry 4.0 as one of the major trends in every industrial sector. With Heye SpeedLine, we show our approach to adapt the best concepts to container glass manufacturing. In particular, the combination of advanced sensor integration, innovative servo technology, closed loops in the forming process and user-friendly interfaces guarantees production environments for maximum performance, highest efficiency and strict safety.

A lot of improvements were necessary to increase production speed, while keeping the highest quality standards. For instance, a separate exhaust air outlet optimises plunger cooling and guarantees smooth performance at higher productions speeds. The new arrangement of the injectors and air manifolds allowed a redesign from the piping to the section. This path optimisation has a positive influence on the reaction time. The newly developed Loadmaster delivery system presents a redesigned deflector adjustment, offering the IS-machine operator the opportunity to convert easily from DG to TG, in addition to optimal gob loading.



The Heye SpeedLine series is available in many configurations, from single to triple gob operation:

**CENTER DISTANCES:**  
4 1/4" TG, 6 1/4" DG, 5 1/2" DG, 5" SG/DG,  
4 1/4" SG/DG, 85 MM TG

## ADVANTAGES

- + Available for up to 24 sections
- + Applicable for BB, PB and NNPB
- + Servo modules e.g. for invert, takeout or pushers
- + Pneumatic closing mechanisms with high clamping forces and long operating lifetime

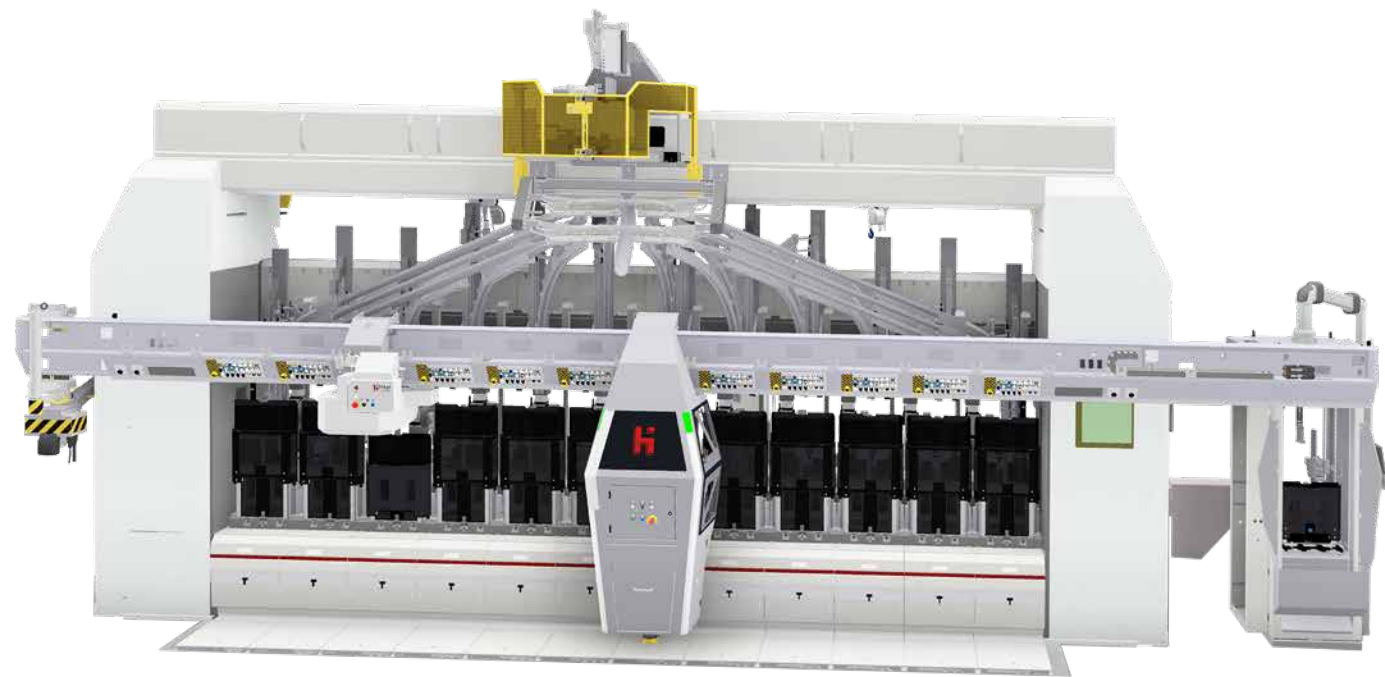
SpeedLine with Protection Grid

WE ARE GLASS PEOPLE

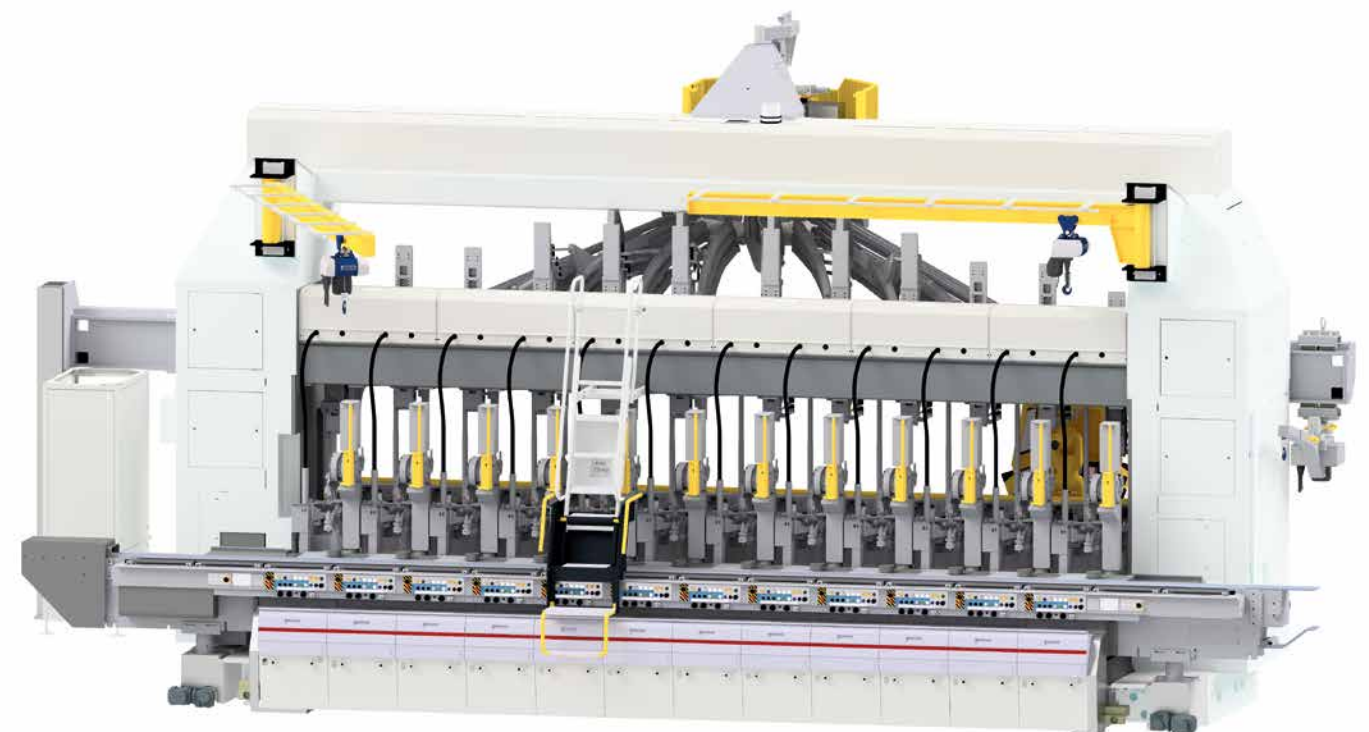


# SPEEDLINE BENEFITS

## INNOVATIVE DESIGN OF HEYE SPEEDLINE



SpeedLine Blank Side



SpeedLine Blow Side

### REDUCED DOWNTIMES

#### ADVANTAGES

- + Easy planning of maintenance cycles due to advanced monitoring systems
- + Heye Process Control and Press Duration Control
- + recognize impending problems at an early stage
- + 6-cycle machine lubrication with pressure and temperature monitoring allows to determine defective mechanisms before complete failure (unplanned repair)
- + Optional supervision of final blow valves enables planned exchange
- + Error reporting server with different warning messages

### LOW OPERATIONAL COSTS AND LONG LIFETIME

#### ADVANTAGES

- + Low downtime costs due to high system availability
- + General overhaul only necessary after 10 – 15 years
- + First class materials and components
- + Extended supervision and sensors
- + Intelligent temperature controlled central lubrication
- + Reduced oil consumption achieves higher cleanliness
- + Optional Heye BlankSideRobot for swabbing the blank moulds avoids loss of containers and increases productivity

### SUPERIOR SPEED COMBINED WITH LONG OPERATING LIFETIME

#### ADVANTAGES

- + Highest quality materials and precise manufacturing processes ensure a very long operating lifetime even in high-speed productions
- + To achieve high speeds, powerful coolings are available
- + Powerful and precise servo-systems work as team with pneumatic cylinders (SpeedLine machines achieve very high clamping forces – ideal for fast NNPB productions)

### HIGH PRODUCTION FLEXIBILITY

#### ADVANTAGES

- + Conversion time from DG to TG and back has been shorted (flexible Loadmaster delivery system, conversion base plunger cylinder, easy to change gob distributor heads)
- + Fast conversion between the production processes (BB, PB and NNPB) by quick-change inserts for BB as well as plunger positioner for NNPB
- + Assortment production (different container weights) on one machine without losing a gob (maximum weight difference 20% depending on gob weight and shape)







# HEYE LED STATUS LIGHTING

## EVERYTHING AT A GLANCE

**For greater safety and a longer service life.  
Everything in view with the Heye LED  
status lighting.**

Depending on customer requirements, the blank side beam of the SpeedLine IS machines can be equipped with one of the following LED lighting systems (optional):

- + WHITE SECTION LIGHTING AS AN INDEPENDENT SYSTEM
- + COLORED RGB STATUS LIGHTING WITH THE OPTION FOR WHITE LIGHTING

The white lighting of the section optimally illuminates the work area for the work to be carried out there, such as job changes. With the RGBW lighting, the colored lighting shows the different operating states of the sections. In normal production mode, the lighting switched off after a short time.

### THE MOST RELIABLE LINK IN THE PROCESS CHAIN: OUR EXPERIENCE

A defined assignment of different colors gives the operator a visual and large-scale display of the possible operating states of the individual sections. This includes:

- + Normal production run (LED status light is off)
- + Section stop activated (green)
- + Start phase (red, flashing)
- + Start-up and operation without gobs ("cold run", red, permanent light)
- + No communication between the status lighting and the HMST control (red, quickly flashing)
- + Special program „lubrication cycle“ (yellow)
- + Special program „Cold blank mould“ (blue)
- + Upcoming lubrication cycle „blank mould“ (orange, flashing)
- + Upcoming lubrication cycle „neck ring“ (violet, flashing)

The 'lubrication cycle' function gives the operator additional support when carrying out daily work routines. By blinking in an assigned colour, the function makes it visible that the lubrication of the blank and / or the neckring is necessary after a defined time interval (after certain minutes or after a certain number of processed gobs).

### WHICH IS MACHINES CAN BE EQUIPPED WITH STATUS LIGHTING?

Colored RGB status lighting with optional white lighting is available as an option for all SpeedLine IS machines that are equipped with modern machine control and HMST control. This additional safety plus provides the operator with another useful tool to support everyday work in a simple way. In addition, maintaining a regular lubrication interval ensures optimal lifetime of the blank moulds.







#### HEYE SERVO GOB DISTRIBUTOR TYPE 2171

The Heye Servo Gob Distributor Type 2171 combines long lifetime and precise running. The model is applicable for IS-machines with up to 12 sections. An operation with single-, double-, triple- and even quad gob for up to 12 sections is possible by simply exchanging the gob distributor head. The maximum swivel range of the scoops is 140°.

At a motion time of 130 ms, a pivoting angle of 70° is possible. The scoops are water-cooled and the oil circulation lubrication for the distributor head contains integrated cooling in the recirculation. The servo motor drives a nearly backlash-free set of worm wheels.

#### THE HEYE LOADMASTER DELIVERY SYSTEM

In IS-machines, the glass gobs are transported to the individual blank moulds by a delivery system. As they pass through the system, the gobs are influenced both in their absolute speed and in their shape. In diversified systems such as the 12-section-delivery, there are undesirable secondary effects. These have been minimised by Heye International, with the result of a very high constancy in gob loading.

#### ADVANTAGES

- + The machined surfaces ensure a smooth run of gob
- + Long coating intervals are achieved
- + The gob always leaves the deflector vertically and can easily be adjusted to the blank mould
- + The need for readjustment is reduced to a minimum
- + Quick change from SG - DG - TG

#### HIGH PERFORMANCE VALVE BLOCKS

Time is a top priority in modern production processes. In hollow glass production, the performance of the entire system is determined by the speed of the individual mechanisms and cooling within the IS-machine. Any acceleration in working speed increases the yield accordingly. Through the high performance of the Heye Modular Valve Block, the speed of the system can be increased, downtime reduced and production optimised.

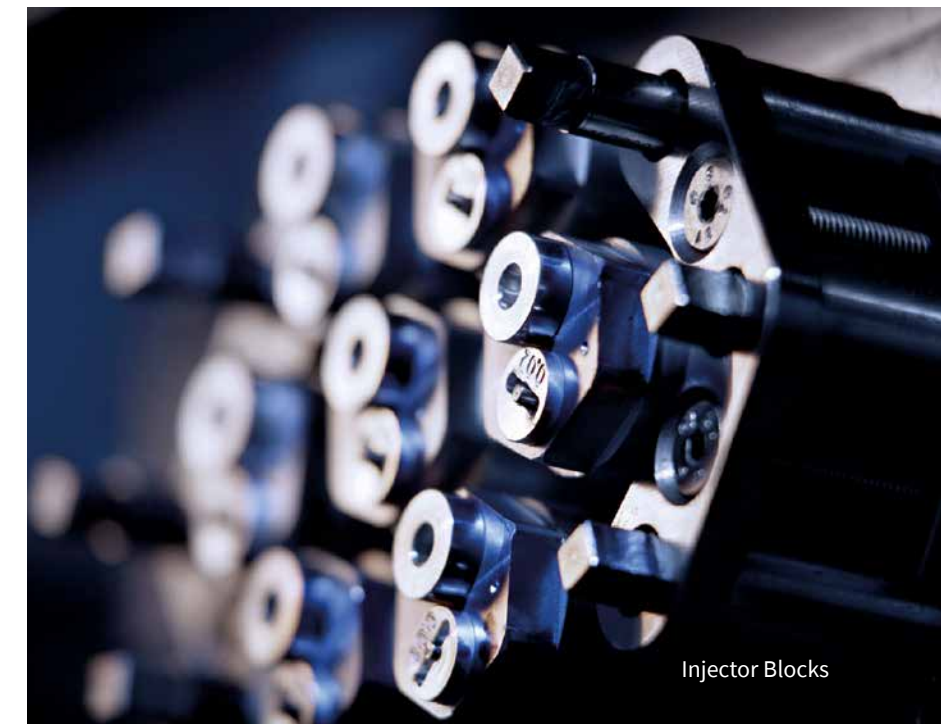


#### HEYE SERVO INVERT

The Heye Servo Invert transports the parisons from the blank side to the blow side. Apart from the integration in new Heye IS-machines, the system can also be used for retrofit projects. The servo motor is located inside the bracket. The motor drives the neck ring holder via a nearly backlash-free planetary gearing, with spur gear connected in series. The synchronisation of all functions is performed by the E-Timing. The motion profiles are freely selectable.

#### HEYE SERVO TAKEOUT

The Heye Servo Takeout serves to transport finally blown glass articles in a careful way from the blow mould onto the dead plate. The servo motor drives the takeout arm via a lowbacklash and highly stressable worm gear. All motion profiles are reproducible and profiles plus the gripper position can be adapted during run. The Heye Servo Takeout is either part of a new IS-machine or can be supplied as a conversion kit for existing machines.



Injector Blocks

#### CLOSED LOOP

##### TEMPERATURE-GUIDED CENTRAL LUBRICATION

With its patented temperature-guided multi-zone system, Heye is setting new standards in efficiency and cleanliness. The multi-zone system allocates injectors that operate under similar thermal conditions to temperature circuits. For the first time ever, the temperature-guided lubrication interval control allows temperature deviations at the lubrication point and the quality of the lubricant to be taken into account. Sensors in the

temperature circuits, each positioned at the hottest lubrication point, regularly transmit signals that are used as input parameters to control the lubrication intervals. Lubricants used in IS-machines are characterised by a very low loss of volume from evaporation. Using the evaporation characteristics of the lubricant, as determined in laboratory tests, the times between lubrication cycles can be calculated for each temperature circuit.

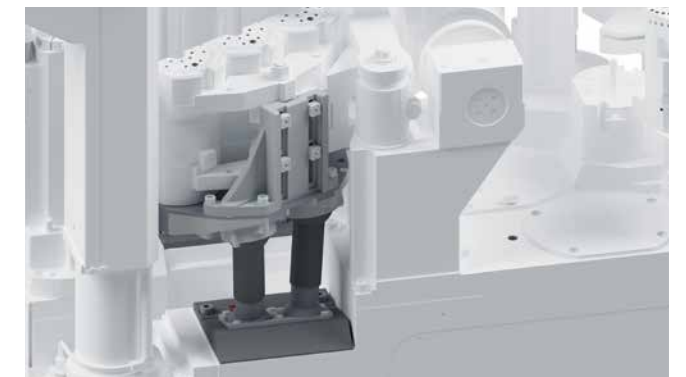
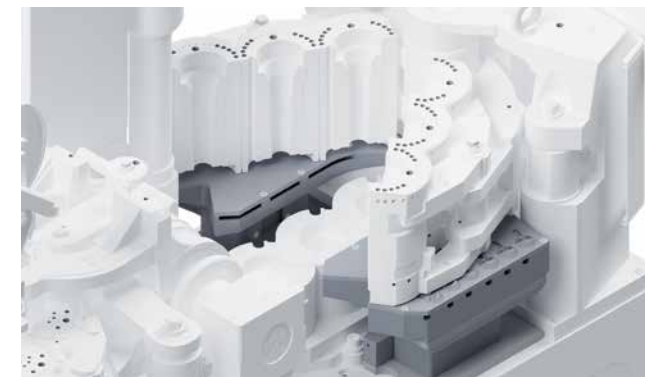
”

Our major furnace repair is an important step towards the future and secures production success for the next two decades. The sustainable and efficient SpeedLine technology of Heye International supports this success exceptionally.

**Hartmut Treichel**

*Plant Manager at Ardagh Group in Neuenhagen*

# SPEEDLINE COOLING POWER



## MASTERING BLANK SIDE COOLING

Cooling power is a key prerequisite to reach high production speeds. Heye offers two options. The AXIAL COOLING TYPE 2242 is designed to cool the blank moulds axially and to cool the neck rings radially with fan air. During a job change, the axial cooling can be converted to radial cooling by changing the upper assemblies only.

Conversions are possible for 5" DG, 6 1/4" DG and 4 1/4" TG. The adaption of the different mould lengths is compensated by the height adjustment of the cooling piece, where the neck ring cooling is automatically adjusted too.

The BLANK MOULD AND NECK RING COOLING HiFLOW 2221 for standard applications permits an ideal heat removal from the blank mould and neck ring. Due to the variable configuration and easy adjustment, nearly every application can be covered.

## 360° HIGH SPEED BLOW SIDE COOLINGS

The new full-cycle (360°) blow mould axial cooling runs over the entire process cycle.

Thus, compared to other cooling systems, a much better cooling performance of the moulds can be achieved and the production speed can be increased. The cooling power is carried out more constantly whereby the stability and quality of the glass containers being produced is influenced positively.



”

The new Heye 360° blow mould axial cooling helped us to significantly increase our production speed. Beside this, the impressive reliability and performance stability are the key benefits of this innovation.

**Andrew Barreau,**

*Technology and Business Development Manager at Orora Glass*



# HEYE WARE HANDLING

SMOOTH AND FAST FOR HIGHER YIELD



Often underestimated, fast and smooth ware handling is a decisive factor to reach high Pack-to-Melt (PTM) ratios. The ware handling equipment from Heye International has been setting market standards for years. Continuous improvement, combined with the latest technology means high value for our customers. Heye offers a portfolio for every need. Starting with the pushers, three different systems are available:

## WARE TRANSFER FOR TOP SPEED

Heye is offering two different ware transfers. Type 4220 offers two additional short conveyors running parallel to the machine conveyor. A maximum throughput of up to 800 BPM can be achieved, depending on the article. Type 4222 is a smaller version with one additional short conveyor and offers an adequate speed range for many standard productions.

**Unique automatic synchronisation:** Both systems feature the automatic synchronisation of the finger chain to the belt, allowing fast restarts after production stops. The optimal speed settings are calculated automatically. This replaces the manual adjustment, which is especially challenging in high-speed productions. Together with the mechanical design advantages, a unique reputation of the Heye ware transfer equipment is the result.



## TYPE 2154

This pusher is a reliable and robust system for article transport at IS-machines, with conveyor speeds of up to 60 m/min. This system uses standard components such as electric motor and a pneumatic cylinder. The high torque of the stepper motor allows good push-out speeds and heavy finger plates.



## TYPE 2157

This 2-axis servo pusher is integrated in the Heye SpeedMaster servo concept. It is used on IS-machines with up to 24 sections and a conveyor speed up to 70 m/min. Long service intervals and minimum wear are standard. The system is ideal for double gob operation but can also be adapted to triple-gob machines.



## TYPE 2158

The high-end 3-axis pusher offers sophisticated motion profiles. Motion and speed profiles can be adapted to the article geometry and transport speed even during operation. A conveyor speed up to 80 m/min is possible and the system can also be used for quad-gob operations. Most of the movable parts are located below the machine conveyor level inside the pusher housing, protecting them from environmental influences such as heat and dirt, resulting in long service intervals, minimum wear and long overall lifetime.

## CROSS CONVEYOR

Depending on the size of the lehr, Heye offers two different types of cross conveyors. Type 4216 is ideal for lehrs up to 3500mm belt width, type 4217 is perfect for smaller lehrs. Both types are controlled by the Heye SpeedMaster servo concept.

## LEHR LOADER

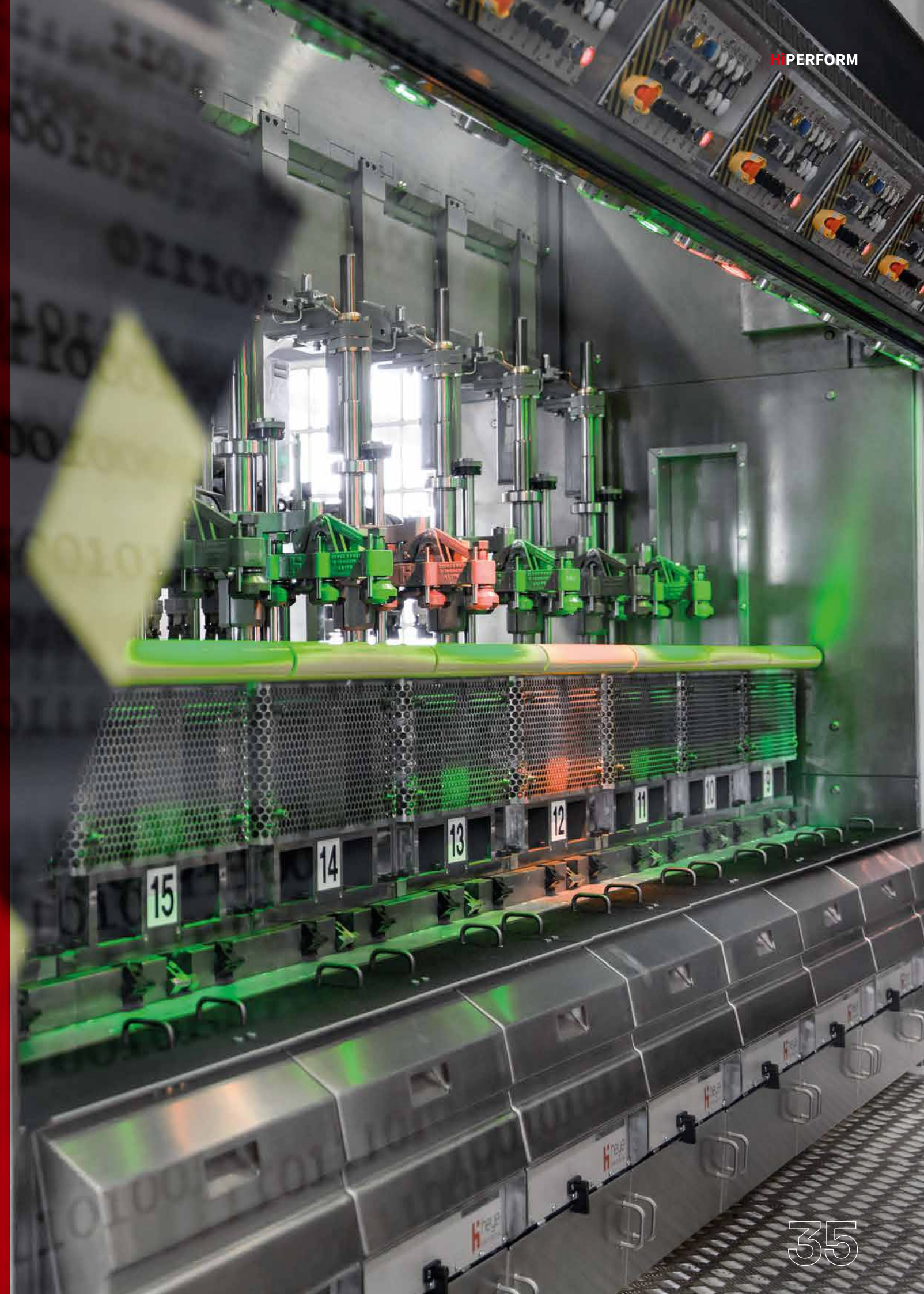
Just like the pushers, Heye is offering three types of lehr loaders. Type 4201 is ideal for simple applications with a speed up to 400 articles/minute. Type 4205 has two servo motors for a maximum speed of 600 articles/minute. Type 4206 is designed with three servo motors for maximum speed of about 800 articles/minute. Again, all types are controlled by the Heye SpeedMaster servo concept.



# HEYE PROCESS INTELLIGENCE

**WE ARE GLASS PEOPLE** – with a long industry experience and a large portion of passion, Heye is in the position to develop solutions for the smart glass plant of the future. Our mission stands for customer satisfaction, the people at Heye and for a partnership in innovation.

**WE ARE GLASS PEOPLE**





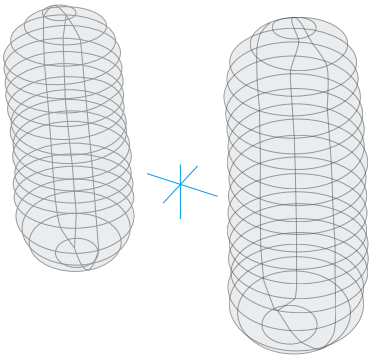
# HEYE PROCESS CONTROL 4.0



The Heye Process Control sets the market standard concerning weight control and control of the pressing process. Leading global fillers insist on the application of the Heye Process Control because of its ability to eliminate important critical defects. The Heye Process Control is Industry 4.0 ready due to its flexible connectivity. Usability is another key advantage, as the real time display and supervision of all pressing processes is very comfortable. An article database containing all article depending parameters eases job changes.

**GOBMASTER: PRECISE GOB MANAGEMENT FOR BLOW-BLOW OPERATION**

The camera system for gob weight control offers the possibility to determine and control the gob weight in blow-blow productions. Two cameras placed underneath the shears act as sensor, while the software logic calculates the weight and automatically adapts the feeder settings. At the same time, the cameras show the gob shape.



3D Gob Image



## Process control and closed loop solution set

**Heye has set the standard in closed loop process control solutions. From feeder to gob loading, from blank side to blow side and from ware handling to lehr, Heye is focusing on the technologies with the largest impact on production results:**

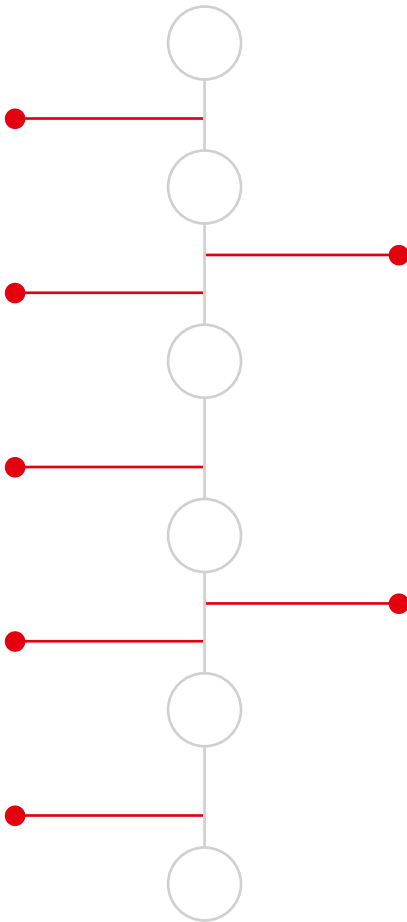
**HEYE PROCESS CONTROL**

**GOBMASTER**  
with new optional camera for gob weight control in blow-blow productions

**BLANKMASTER**  
Gob Loading Camera & Blank Side Temperature Control

**THERMAL IMAGE SENSOR (TIS)**  
for monitoring temperature on the blank side

**CLOSED LOOPS FOR HOT END WARE HANDLING**  
to ensure high production speed and Hot End efficiency



**HEYE PRESS DURATION CONTROL**  
for optimal glass distribution and wall thickness

**BLANK SIDE TEMPERATURE CONTROL**  
to maintain a constant parison temperature

## Heye Press Duration Control

The Heye Press Duration Control is an additional feature to the Heye Process Control, focusing on the optimisation of the glass distribution, respectively the wall thickness. The closed loop algorithm guarantees a constant press duration by modifying the pressure for the plunger-up movement. Job changes become easier by the automatic adjustments and start-up times are reduced. The system is also important for preventive maintenance, e.g. if the pressure values exceed the limits and mechanical problems can be corrected at an early stage.

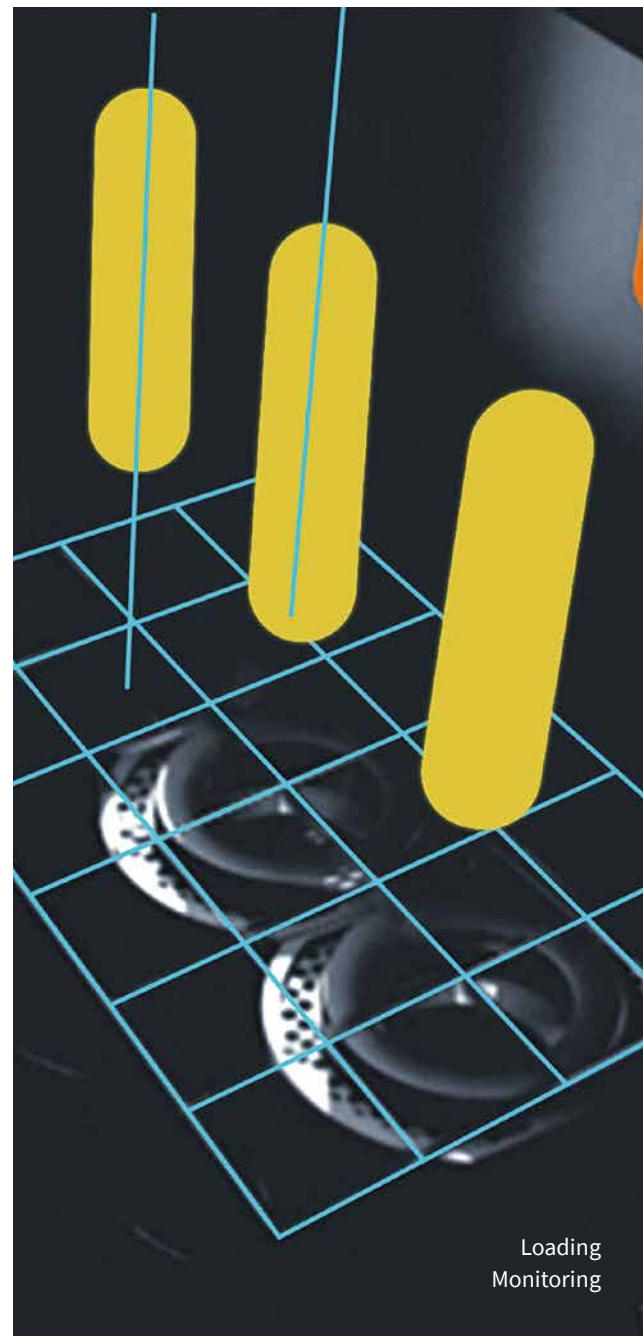


Equal Wall  
Thickness

## BlankMaster

One equipment - two functionalities:

The Heye BlankMaster unites precise gob loading monitoring with optimal temperature management on the blank side. A camera automatically measures gob loading parameters while a pyrometer measures blank side temperatures in the area of the blank, plunger, neckring and parison. This combination avoids defects and leads to enhanced process stability and short job change times.



Loading  
Monitoring



Blank Side  
Temperature

## Blank Side Temperature Control – optimal temperature management on the blank side

The blank side temperature control is a closed loop solution to improve the wall thickness, while achieving better process stability and short job changes.

Most important is the parison temperature, which is the basis for the closed loop control logic, developed by the Heye glass experts. The system modifies the cooling intervals for the blank mould halves, the neckring and the plunger. The result is a stable parison temperature, leading to better glass distribution and process stability.

## Thermal Image Sensor (TIS)

The Thermal Image Sensor is a system for monitoring temperature on the blank side of Heye IS-Machines. The images for the complete machine; like mould tools (blank mould, neckring, plunger) are displayed on an overview page.



# HIGH SPEED WARE

## HANDLING CONTROL



Machine Conveyor

Optimal Hot End ware handling is important to reach high speeds. Often underestimated, fast and smooth ware handling is a decisive factor to achieve high Pack-to-Melt (PTM) ratios. Ware handling itself begins with the pusher system, which moves containers from the dead plate to conveyor belt. Another important part is the ware transfer, where Heye sets the market standard in production speed.

### WARE SPACING

The Heye ware spacing closed loop optimises the distance between the bottle-packs that the pushers are moving onto the machine belt. A light barrier in front of the coating hood acts as a sensor to measure the distance between bottles. The software algorithm adjusts the starting points of the pushers in case of deviations. This feature allows to go to the maximum production and handling speeds.

### AUTOMATIC WARE TRANSFER SYNCHRONISATION

The core of this feature is an automatic synchronisation of the finger chain to the belt, allowing fast restarts after production stops. The optimal speed settings are calculated automatically. This replaces the manual adjustment, which is especially challenging in high-speed productions. Together with the mechanical design advantages, a unique reputation of the Heye ware transfer equipment is the result.



### DEAD PLATE COOLING CONTROL

A prerequisite for high pusher speeds is that the containers are standing properly and equally tempered on the dead plate. This is guaranteed by the unique dead plate cooling control, which keeps the amount of cooling air and the time interval on a constant and optimal level. The data are set in the Heye Cockpit and are kept stable for each cavity in the different sections. Thus, job change times become shorter and the container handling process becomes more stable.

Dead Plate Cooling

# PRODUCTION QUALITY AND PRODUCT SAFETY

The quality and consistency of global brands is increasingly important to producers of consumer goods. Product safety and purity are major issues and Heye offers the solutions to ensure glass container production quality. At the beginning of a partnership, everybody needs to get to know one another. This is why Heye often starts with line audits and a proposal for an optimisation of the inspection layout. The result is a cost-efficient concept for the Cold End, respecting both the brand owner's requirements and the budget requirements of the customer. Apart from delivering an extensive range of advanced inspection equipment, an information management system brings together all relevant data, crossing the borders between Hot End and Cold End.





# SMARTLINE 2

## NEXT LEVEL IN SPEED AND FLEXIBILITY

The Heye SmartLine 2 is the new generation of Heye's starwheel inspection machine series. The SmartLine sets the standard in reliability and robustness. The user interface has been improved and makes job changes as easy as possible. Both the mechanical design but also the control unit are extremely reliable and easy to operate. The large hood gives maximum access to the working space, reducing the job change times to the absolute minimum. Latest non-contact inspection features are integrated, as well as a self-learning system for camera-based check detection.



### INSPECTION SPEED AND JOB CHANGE TIME

The application of servo technology results in a high degree of flexibility. Fast and easy changes of the item indexing positions and optimal use of the servo torque for up to four rotation stations are possible. Optimised motion sequences allow faster reactions to changing process parameters.

The new design and the large and easy-to-open cover provide more working space between the inspection stations.

- + THE STANDARD ARTICLE HEIGHT IS 400MM (UP TO 500MM ON REQUEST); ANGULAR, OVAL AND ROUND CONTAINERS CAN BE PROCESSED
- + THANKS TO THE SERVO DRIVEN STAR WHEEL, INDEXING POSITIONS FROM 6 TO 48 ARE USABLE
- + THE ENLARGED WORKING RADIUS ALLOWS A HIGH COMPATIBILITY WITH EXISTING TOOLING SETS

### QUALITY AND RELIABILITY

Innovations have to stand the test of time. This is achieved by the use of robust industrial electronics and a climate-controlled electrics and electronics compartment, together with high quality components. Operational usability is enhanced by a touchscreen monitor, easy access to all electronic components and an extricable mounting plate for frequency inverters and servo controllers. Hazard-free working condition for the operator is provided by a microprocessor-controlled safety module.

### FLEXIBLE INSPECTION OPTIONS

The SmartLine can be configured in different ways. Up to six inspection stations are available. Depending on the customer's requirements, various container attributes can be checked:

- + Tightness
- + Finish diameters
- + Container height
- + Finish and shoulder checks
- + Bottom and heel checks
- + Body checks
- + Wall thickness inspection (non-contact)
- + Defects of the finish surface (LOF - line over finish)
- + Out of round, body diameter
- + Mould number reading (dot code and alphanumeric)
- + Dark check inspection





# RANGER 2

## CAMERA CHECK DETECTION

**Check detection is one of the most important quality inspections in container glass production. The HiSHIELD Ranger 2 has been developed to fulfill the customer's quality expectations.**

### FULLY MODULAR AND SCALABLE SYSTEM

A Ranger 2 system consists of one camera, collecting five images simultaneously via five lenses and fiber optic light guides, the illumination unit and the control unit with the software for image processing, including the decision "container okay or not okay".

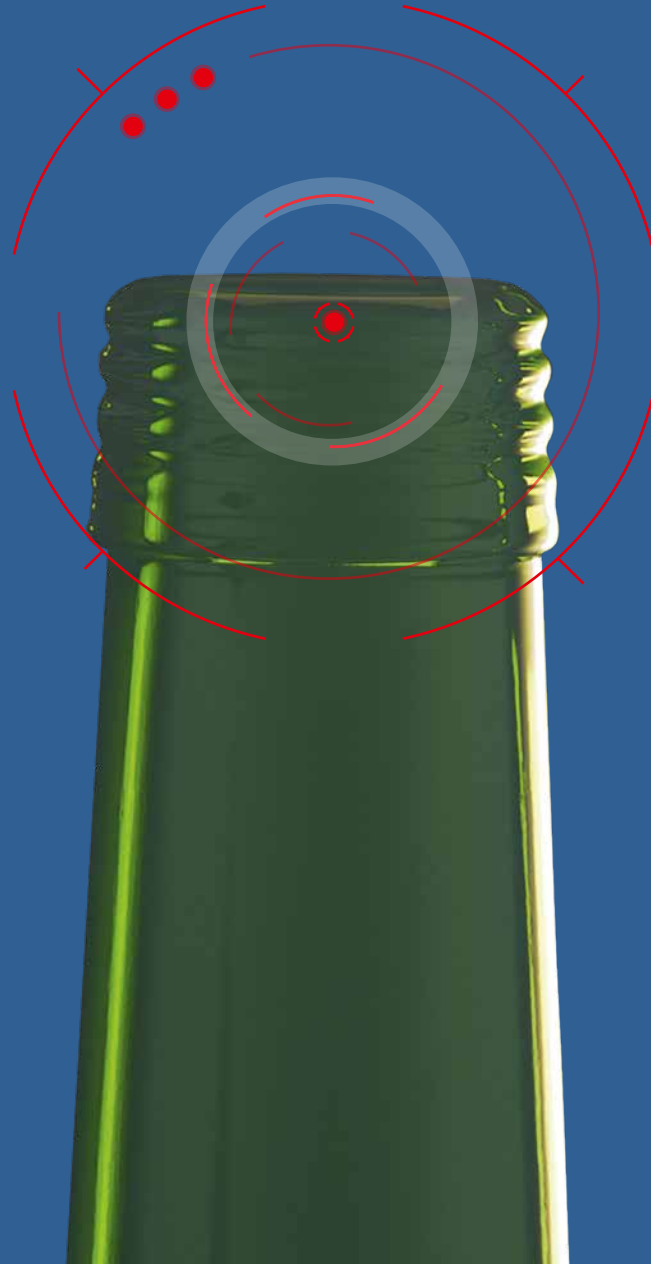
Based on your budget and needs, you can start with one system and add any number of parallel systems whenever you want. A typical and recommended configuration would be four parallel systems, each dedicated to and optimized for one of the following types of checks:

horizontal    shoulder    vertical    bottom

Each system runs independently and does not need to be synchronised with the others. So there is no influence or need to compromise between the systems. This allows an individual optimisation of all settings (illumination etc.) for the respective type of check. If one system is not available or not adjusted optimally, the others are still fully operational.

### INTELLIGENT CLOUD MASKING – SELF LEARNING SYSTEMS

Every container produced must be regarded as a unique object and any check detection concept has to respect this. For this reason each Ranger 2 system is using Heye's Intelligent Cloud Masking. Bearing in mind that each article is distinctive, the Ranger 2 system is designed to investigate each one independently. Accordingly, each container serves as a reference for itself. But moreover, the inspection zones are dynamic in nature. The Ranger 2 system is therefore able to detect different variations of checks, as well as to recognize new variations of them during production. No sample bottles are needed, as the system is absolutely flexible.



# WALL THICKNESS

## MULTI-POINT AND SINGLE-POINT

In container glass production, wall thickness measurement is one of the most important aspects. Heye offers a flexible package for every need. The MTE electronic module can handle single-point as well as multi-point sensors. A major advantage: Heye is using the superior chromatic confocal method, which is much more precise, robust and reliable than other solutions.

### MTE 12 ELECTRONICS

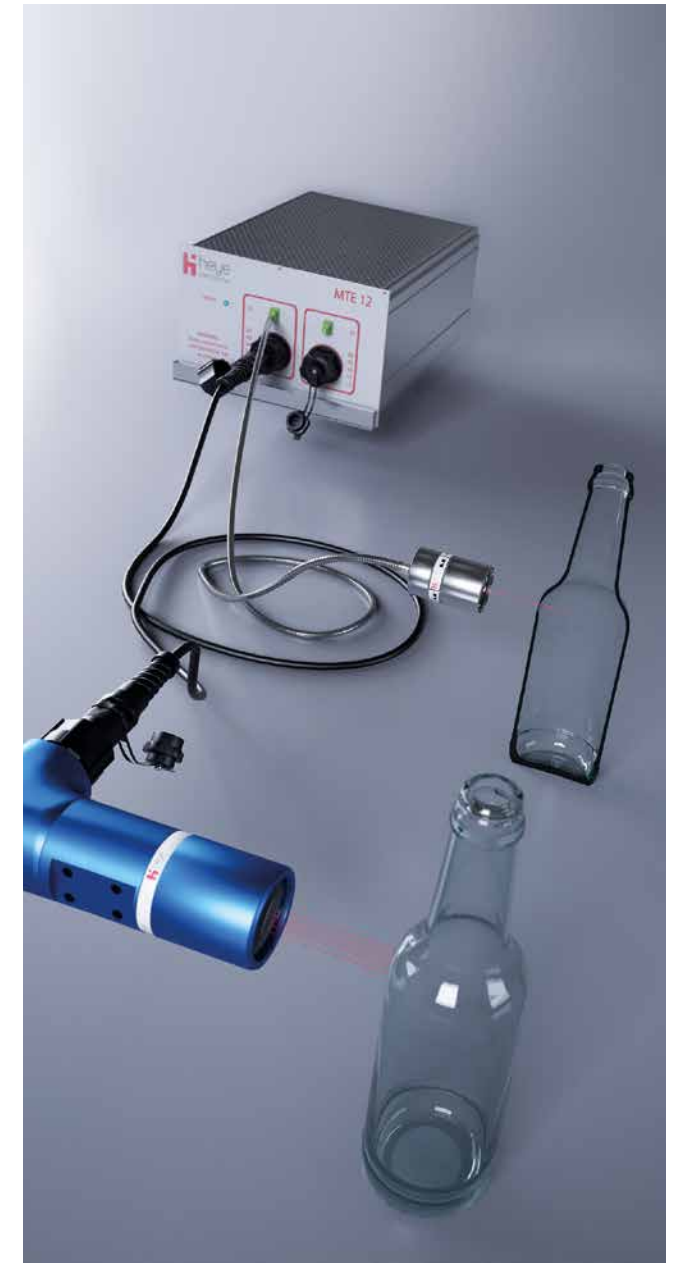
The MTE 12 supports the latest multi-point sensor MTS 10/05, as well as the well-proven single-point sensors. It can handle up to 4 sensors and 12 measuring points simultaneously. This allows the fast and precise inspection of all critical container areas at the same time. The MTE 12 is available as a stand alone unit, adaptable to numerous inspection machines, or as an integrated component in the Heye SmartLine and other machines with Heye control.

### MULTI-POINT THICKNESS SENSOR (MTS 10/05)

The Heye MTS 10/05 is equipped with 5 measuring points, spaced 2.5mm apart. All 5 points simultaneously measure the wall thickness using the chromatic confocal method. This allows a wide range of possible settings for measurement distance and measurement angle to the surface. With this multi-point thickness sensor, it is possible to inspect the wall thickness along a line of 10mm length. An inspection area 10 times larger than a single-point sensor improves the quality and reliability of inspection. This makes it very easy to find the right points of inspection to cover all possible thin areas of a container.

### SINGLE-POINT THICKNESS SENSOR

The well-proven single-point wall thickness sensors are available in different versions. One can choose between sensors with long or short working distance and normal or very compact sizes, depending on the dimensions and shape of your containers and the available space in your inspection machine.





# DATA MATRIX CODE READER

## ON THE HEYE SMARTLINE 2

**Data matrix hot end laser marking is developed for marking containers with traceability information and improved communication between hot end and cold end by the principle of associating forming parameters with inspection data.**

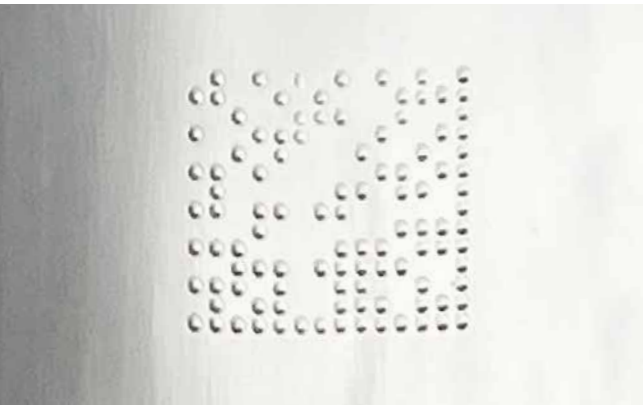
With the Konatic Spin Reader, which is now integrated to the inspection portfolio, Heye offers a reading solution for the SmartLine 2 inspection machine.

**BENEFITS AT A GLANCE:**

- + ONLY ONE HEAD TO INSPECT EITHER AT THE NECK OR IN THE BODY AREA
- + EXCLUSIVE SOLUTION TO READ IN TRANSMISSION MODE OR REFLECTION MODE FOR A FULL FLEXIBILITY
- + REFLECTION MODE AT THE BODY IS VERY USEFUL WHEN THE SPACE IS LIMITED
- + POSSIBILITY TO READ ON VERY DARK COLOUR ON THE NECK WITH REFLECTION LIGHT
- + DEDICATED ALGORITHM TO DISCRIMINATE THE CODE FROM LOADING MARKS AND SCRATCHES FOR HIGH READING EFFICIENCY
- + CONTROL OVER 360° WITH ROTATION OF PRODUCTS
- + DATA MANAGEMENT: CLOUD COMPUTING, WEB SERVICE, OR MODBUS TCP.
- + SIMPLE ADJUSTMENTS.
- + PATENTED TECHNOLOGY



Reading in transmission



## Heye Mould Number Reader – KSL 3

With the Mould Number Reader KSL 3 Heye is taking the step to Artificial Intelligence (AI) in visual inspection. The system is able to learn shape number deviations by an evaluation algorithm, falsely rejected mould numbers can be trained. Mould number deviations can be caused by e.g. wear or pollution. With this technology KSL 3 is able to increase the reading rate of badly engraved mould numbers to over 99%.

**EXAMPLE:**

If mould number 04 is not read correctly it can be “trained”. This technology allows the system to be set up faster and easier, and mould numbers that were previously not readable can now be read. The capability to increase the accuracy and repeatability by an evaluation algorithm brings the whole rejection process to a higher efficiency. AI technology and the resulting reliability brings a clear monetary benefit to the customer.

**ADVANTAGES AT A GLANCE:**

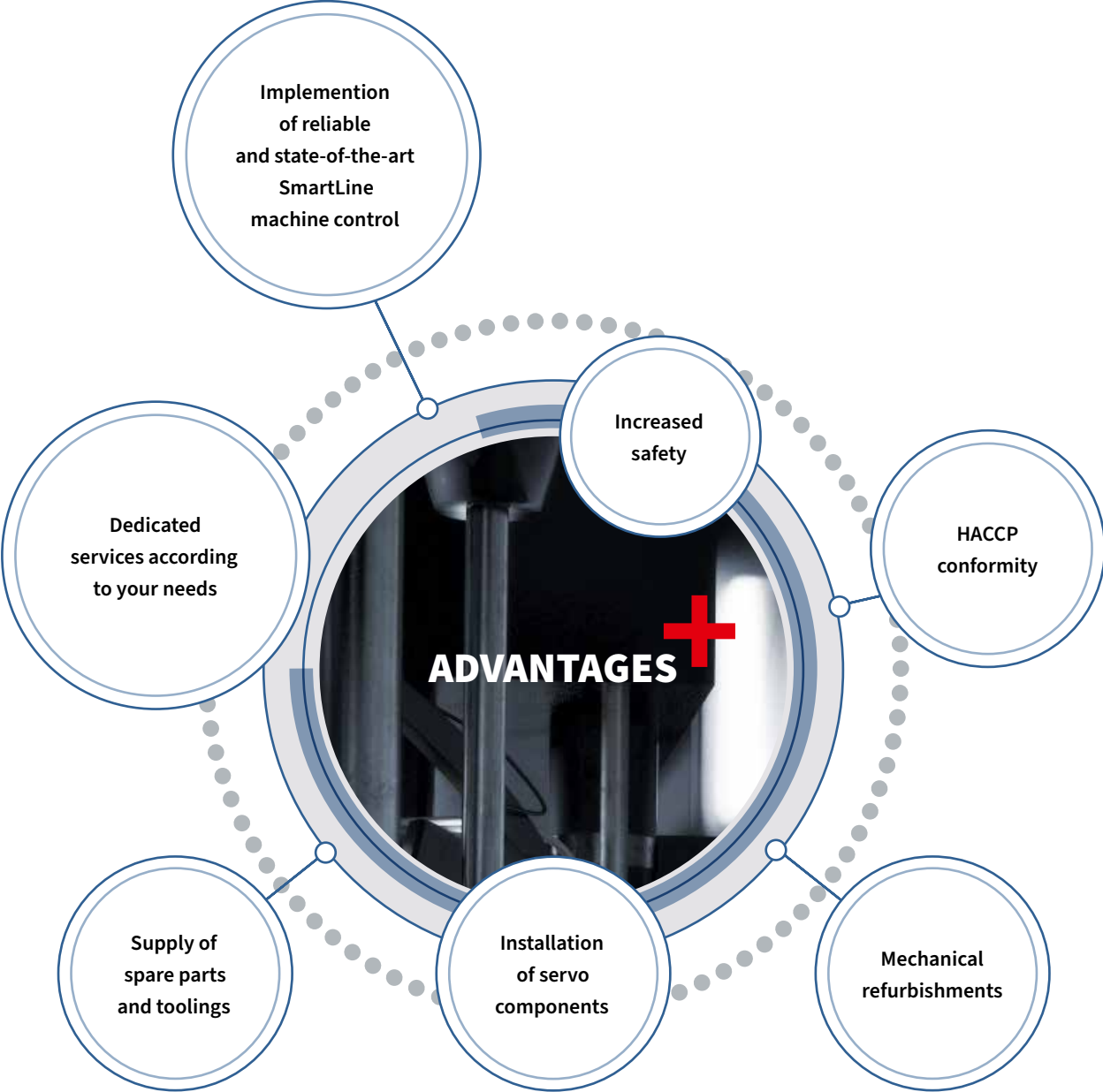
- + Increase of reading rate up to over 99 %
- + AI algorithm increases the reading rate of badly engraved mould numbers caused by e.g. wear or pollution
- + Extension of the ability to recognise standard digital mould numbers that are available on the market
- + KSL 3 can read all standard alpha-numeric codes, located in center of the bottom
- + Recorder functionality available
- + Reduced setup times
- + Intuitive GUI navigation





# SAFETY & HACCP CONFORMITY

RETROFIT SOLUTIONS FOR EVERY BUDGET



Retrofitting of existing machines is often a good alternative to buying a new one. Heye offers a special kit to lift your existing starwheel machine to the next certification level. This may involve the installation of specially fabricated hoods and other safety-related features to ensure full HACCP compliance.

In addition, the old control units can be replaced with the latest Heye control system, combining unparalleled reliability with ease-of-use. Heye Cold End experts in Nienburg, Germany have comprehensive experience with many variants of starwheel machines.



# WITH EXPERIENCE AND PASSION

We develop solutions for the smart glass plant of the future. This mission stands for our production expertise and for the people at Heye. Our ambition and our passion is to provide complete customer satisfaction from consultancy, delivery of equipment and production process expertise to long term assistance in production.

# HiTRUST



**ENGINEERING**



**PROJECT  
MANAGEMENT**



**TAA – TECHNICAL  
ASSISTANCE**



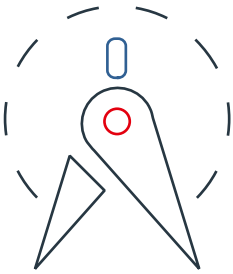
**TRAINING**

**WE ARE GLASS PEOPLE**



# ENGINEERING COMPETENCE

FOR HIGH SAFETY



Usability and Safety

”

We have combined the best engineering and manufacturing features to meet our customers' highest quality needs. Focusing on harmonising with international standards and continuous improvement in all of our activities, the glassworks project aims to capture the success achieved by the Bastürkler Sirketler Group elsewhere around the world.

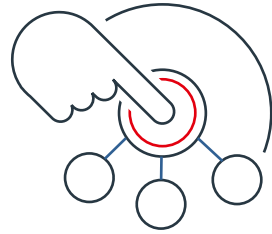
Bastürk Cam

Our engineering team has the competence to professionally handle all areas of a glass plant. The basic design offers all necessary information for a more detailed budget information of the project. Doing so, they are not only focused on the scope of Heye equipment but are also taking care for all the surroundings in the specific area. Our Hot End detail engineering ensures effective technical solutions. The operators can focus on the manufacture of bottles, with safe and easy access to the equipment at the Hot End area and ergonomic arrangement of control element equipment and tools.

Also for the Cold End part of a glass plant, Heye offers detailed expertise for an optimal design of the inspection loops and the packaging area. Depending on the article range and the customer portfolio, our experts help to find a cost-efficient set-up for the Cold End. This also includes a concept for the data management of all relevant quality information, including connection to a plant management system.

# PROJECT MANAGEMENT

IN CONTAINER GLASS PRODUCTION



Heye International has experience from many and varied projects of every type all over the world. This knowledge is gathered together in the HiTRUST process chain, a complete tool package for the container glass industry, managing every aspect of your project. Our know-how covers all project stages with our international pool of experts in each field of knowledge.

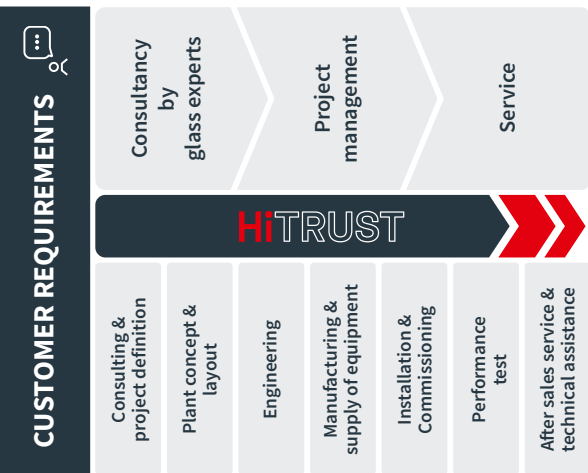
Each project has its own professional, experienced project manager, who leads every step and is the consultant for the customer. Therefore Heye International developed its own Project Management Handbook, called PM@Heye, which is based on the international PMI rules. With PM@Heye all project partners have a structured project program with:

- + MILESTONES
- + WORK PACKAGES
- + RESPONSIBILITIES
- + PROJECT ORGANIGRAM WITH CONTACT PERSON



IS-machine Transport

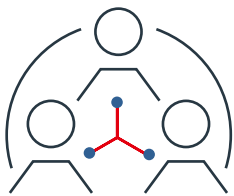
The Heye International project managers give continuous progress reports and are responsible for making sure the project is finalized up to quality standard, on budget and on time.





# TRAINING EXPERTISE

BECAUSE KNOWLEDGE IS POWER



Training in Glass Plant

**We can train your staff at our own dedicated training centre, on-the-job in glass plants or on-site, in the environment in which they actually work.**

At Heye, we know that the greatest asset a business has is its people. Specialist knowledge and expertise is necessary to help implement new technology or processes and to improve production efficiency. We provide you a training portfolio covering every production step, like glass chemistry, batch and furnace management, Hot End machine operating, mechanics and electronics specialist, mould repair or quality management.



These training programmes were positively received by local glassworks personnel in Brazil.

**Lorenzo Barquin**

*Global Director Glass Operations at Ambev*

# TECHNICAL ASSISTANCE BY HEYE

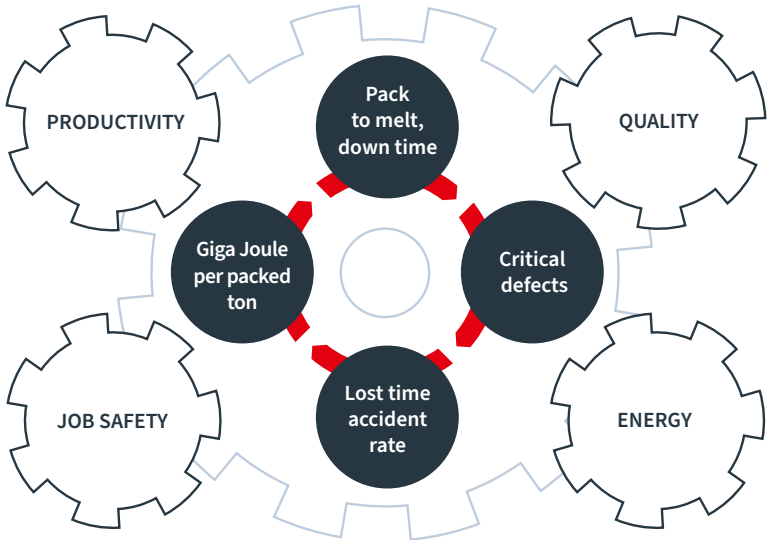
BOOSTING YOUR EFFICIENCY



When new technologies are implemented or plant performance is being pushed to the next level, the technical assistance from Heye is the answer. In more than 60 years, Heye has built a unique expertise in container glass production.

Heye International is offering a true long term partnership for the improvement of productivity and quality of the customer's production. This is the only way for a sustainable improvement of the core Key-Performance-Indicators (KPIs) of a glass plant.

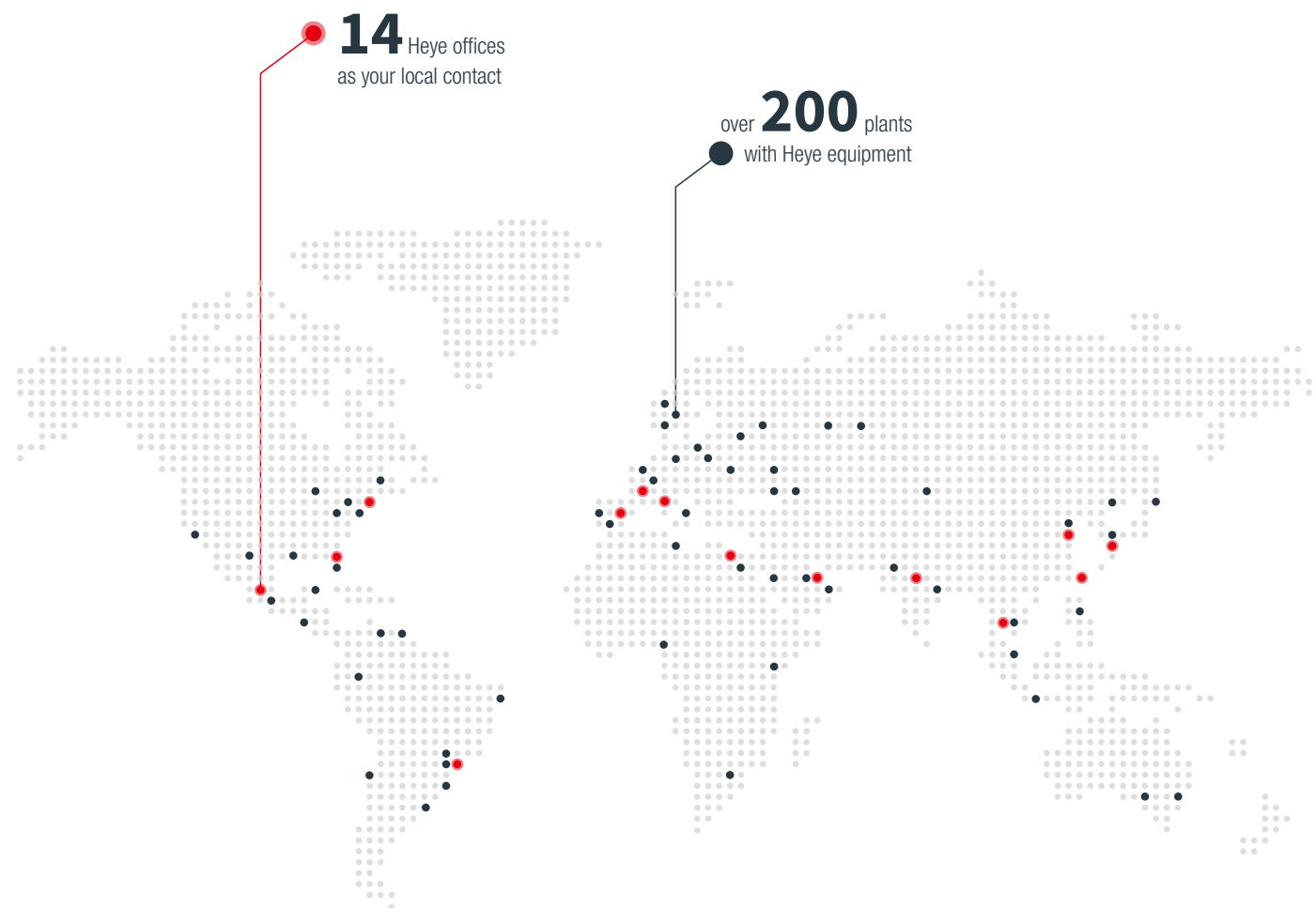
## KPI MODEL FOR HEYE TAA



Starting with a plant audit, every customer gets a dedicated expert team. The Heye TAA manager has at least 25 years of experience in container glass production. Also the other team members have experience, whether in melting and glass chemistry, mould design and mould repair, forming, NNPB, inspection or quality improvement. However, each Heye expert knows exactly that efficient production is not the result of a single person; it is always the result of a good team, knowing how to make use of the equipment.



# HEYE IN THE WORLD



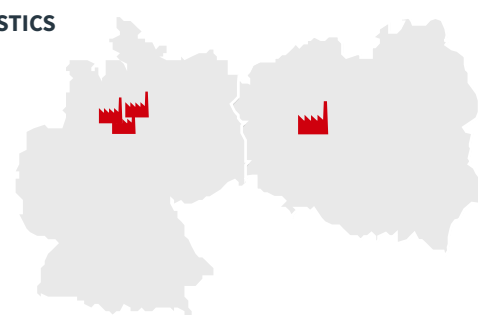
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## HEYE MANUFACTURING & LOGISTICS GERMANY POLAND

Obernkirchen  
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Stadthagen

Poznań



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