

# NEW ERA

*KHS presents the innovative filler platform for glass bottles / Not only the technology of the new, innovative glass bottle filler concept Innofill Glass by KHS is the Best of the Best. What's more important is that the optimized Hygienic Design concept will give the companies who use it direct competitive advantages. These include improved filling quality and considerable cost reductions. For technicians and businessmen alike, this is the stuff of dreams.*







## *At a glance: Innofill Glass*

- Increased filling quality
- Faster cleaning
- Higher availability
- Reduced maintenance costs
- Lower energy costs
- Less water consumption
- Less cleaning media
- Short changeover

... are achieved through comprehensive hygienic design and modern, lubrication-free components with optimized wear properties – developed by KHS with its highly specialized partners.

Innofill Glass: Significant reduction in weight and parts in the filler carousel.

## “Our head ...,”

French writer, painter and graphic artist Francis Picabia (1879 to 1953) discovered, “... our head is round so our thinking can change direction.” The master was looking far ahead into the twenty-first century. Because, as Michael Batz, dramatic adviser and light artist from Hamburg (Reichstag, Speicherstadt Hamburg), put it, for some time already, “it is not either/or exclusivities, individual highlights or more or less rigid systems what matter. Thinking today is formed by plurality, controllability that should be as easy as possible, time management and the ability to communicate combined with low energy consumption and high efficiency.”

### It's about secured product quality and protection of the consumer

In addition, and as the basis of all considerations, KHS focuses constantly on the customer in its market. What are the latter's requirements? What does the customer need from a technological and economic perspective? How does the customer gain a lasting competitive advantage through KHS technology and services? These were exactly the questions the developers in the KHS group asked themselves when they worked on an innovative system for glass filling lines, which is now ready for operation. The focus here: hygienic design and automation. Competitive companies regard hygienic design as a major criterion for lowering costs in production. Above all, however, it is about secured product quality and protection of the consumer, but also about health at work for the own staff.

Until now, beverage machine engineering normally optimized many individual components in terms of hygienic design without considering the adjacent machine parts. Problems: Optimizing, modernizing, and changing over existing designs always reach limits and obstacles – as long as the basic design needs to be preserved. Hygienic design thus remained piecemeal. Solution: the complete redesign of a filler line in that all design steps focus on the hygienic design aspect from the beginning without any regard of currently existing components. The team put everything to the test, reassessed every detail and eventually implemented the knowledge gained in innovative systems.

The result is a platform-based machine concept as we find in the automotive industry. There, a platform defines the common technical basic concept, and the functions of the different models are oriented towards that basic concept. The definition at KHS is similar. A technical basis is now available that the different computer-controlled KHS filling systems are built on and that takes the respective individual criteria of the specific filling methods into account. The first filler for the KHS Innofill Glass platform system is the DRS-ZMS pressure filling system used for bottling beer. Other filling systems for soft drinks, water, wine, sparkling wine, and spirits will follow.

KHS thus heralds a generation change in filling machines for glass bottles that offers a wide range of benefits, such as an even better filling quality, higher line availability, and reduced cost of maintenance, power, water, and cleaning agents. This is achieved primarily thanks to the use of modern and lubricant-free components with optimized wear behavior, which KHS has developed in close cooperation with its highly specialized partners.







## THE NEW TECHNOLOGY AT A GLANCE

*Hygienic design is always also a matter of calculated simplicity. Simple design rules are therefore indispensable:*

- Easy access to all machine surfaces (sanitizing, disinfection, inspection, maintenance).
- Avoidance of complex machine surfaces (wherever possible).
- Avoiding hidden areas (where deposits and biofilms can accumulate).
- Unobstructed runoff of liquids.

**Basic design.** The function of the basic design – in brief – is to feed glass bottles into the machine, supply them to the filling and capping process, and subsequently discharge filled and capped bottles from the machine. The focus of the development work was therefore to design all parts relating to bottle conveying, with focus on hygienic design. Key features: supporting pipe bodies that are open on all sides (optimally accessible for cleaning and disinfection) / broken glass falls directly to the floor and is easy to remove / stars and cappers are interconnected by flangeless cross-pipes and secured towards the outside by hygienically designed sealing systems / all bottle format parts are





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# 1

Injection of water at high pressure into filled beer bottles: the medium is fed through a hollow shaft within the torque motor.

# 2

Ludwig Clüsserath, Manager, Filling Technology Competence Center: "KHS is introducing a new era in filling technology with the Innofill Glass concept."

- ▶ designed to allow for optimal cleaning / weight-reduced design with easy-to-operate shape and position fixing locking pins / container format parts can be changed easily and quickly without any tools.

**Conveyor.** A new stainless steel conveyor with open design conveys the glass bottles directly to the feed screw. An automatic cleaning system can be integrated. The feed screw has no large surface areas. Instead: many rounded and sloped surfaces allow liquids to run off / the unit is driven by a stainless-steel encapsulated round servomotor / attachment systems comprising bottle glide and guide strips (automatic cleaning) prevent the formation of gaps and niches where beverage residue could accumulate and microorganisms could grow.

**Machine carousel.** The lightweight construction of the lift cylinder table and the tubular ring bowl additionally reduces the required driving forces / the tubular shape of the ring bowl allows for efficient cleaning results / the significantly reduced amount of materials saves energy by shortening the heating and cooling phases / electrical signal and output transmission to the carousel by maintenance-free rotary distributors / linear drive technology adjusts the height of all outer control cams and stop segments (control ring with additional height adjustment motor, angle gears, universal joint shafts and lifting columns are no longer required) / bottle-lifting elements offer more room for discharging broken glass / height-adjustable scissor joints equipped with aseptic sealing systems supply beverage and process media. The result is a noticeably reduced number and variety of parts in the filler carousel (more efficient cleaning and maintenance).

**Torque motors.** Transfer stars and cappers operate with low-wear and energy-efficient torque motors (without gearbox) / high torques / no mechanical abrasion / 96% efficiency [conventionally: 85%] / minimized wear / long service life). The energy conservation potential is up to 20%. Another advantage is the hollow shaft design. Media are fed through the hollow shaft for injection at high pressure, for example.

**Filling system.** The Innofill DRS-ZMS filling process has been optimized further. At the same time, however, the tried-and-tested filling process principle is essentially maintained (filling level probe / triple evacuation / double CO<sub>2</sub> rinsing / fast filling phase / precise fill level measurement / low-foam pressure-controlled pressure relief / speed-independent filling process / option for central changing of valves at any time).

**Modifications:** Optimized swirler allows for improved low-turbulence and smooth filling while ensuring minimum oxygen pick-up / bell rods exposed to the outside and sloped surfaces ensure easy cleaning of the filling valves / hose connections no longer need to be hooked up separately.

**Electrical elements.** There are no electrical elements, cables, or pneumatic supply hoses in the area of the filling valves and bottles / controlling pilot valves are arranged within a protected area, completely encapsulated in a housing.

**Compact valve manifolds.** Fittings are specifically constructed vertically and not horizontally / this offers the advantage of taking up 50% less space; maintenance and checks are easier / compact valve manifolds are positioned in the immediate vicinity of the filler cladding / advantages: media passages are very short; quick, and efficient cleaning.





2



## Vacuum Pumps: Systematic Modules

As part of the new product line for glass bottles, KHS presents a standard model for vacuum pumps that is also modular in design. Naturally, it also offers a large number of advantages for bottling plants. And, what's more, it already fulfils EU regulations on energy efficiency, which will become effective in 2017.

When bottling beer in glass bottles, vacuum pumps reduce oxygen pickup and CO<sub>2</sub> consumption thanks to gas exchange. The standard practice to date has been to customize only one vacuum pump for the respective filling system, for example in terms of the filling output, the product temperature, or the CO<sub>2</sub> content in the product. Many versions

of these pumps differed as far as their electrical systems or size and equipment are concerned. In the future, KHS will offer a standardized vacuum pump model. Only the following decision must be made depending on the output of the filling system: does the filler require one, two, or three identical vacuum pumps?

### Example: becoming flexible!

An example of minimized power consumption and partial redundancy/redundancy: a filling system processes 50,000 0.33-liter or 50,000 0.5-liter glass bottles.

**UP TO NOW: ONE VACUUM PUMP WITH 18.5 KW CONNECTED LOAD.**

**IN THE FUTURE: TWO VACUUM PUMPS WITH A CONNECTED LOAD OF 15 KW EACH.**

#### Both versions

**Capacity in the operating point:**

14.5 kW at 50 Hertz

**Possible output of vacuum pump:**

26,000 liters per hour

**Possible line output if one pump fails:**

The line stops

#### Option 1: 0.33-liter glass bottles

**Number of active pumps: 1**

**Capacity in the operating point:**

50 to 60 Hertz / 8 to 12 kW

**Possible output of vacuum pump:**

16,500 liters per hour

**Possible line output if one pump fails:**

100%  
(50,000 bottles/hr x 0.33-liter bottles)

**If one pump fails:**

Second pump is switched on

#### Option 2: 0.50-liter glass bottles

**Number of active pumps: 2**

**Capacity in the operating point:**

50 to 60 Hertz / 12 to 16 kW

**Possible output of vacuum pumps:**

25,000 liters/hr (2nd pump switches in\*)

**Possible line output if one pump fails:**

75%  
(37,500 bottles/hr x 0.5 liters/bottle)

**If pump fails:**

Second pump capacity is regulated upward

\*At a low frequency value always in optimal operating point



### 3

Just one type of vacuum pump is sufficient for the new range. Up to three can be connected in parallel depending on the capacity.

### 4

The KHS operating panel has received many awards thanks to outstanding ergonomics, accurate navigation and brilliant design.

► **Vacuum pump.** For the new product line, a single pump type is sufficient; depending on the output, up to three are connected in parallel. This saves costs and reduces the footprint, lowers power and water consumption and ensures fast supply with spare parts.

**Crown capper.** A more open design improves cleaning of many individual elements / closed servo motors substitute belt drives and other driving systems that were operated by belts or gear wheels / most important innovation: cappers for other closure types can be added like modules without any preparing investment and can easily be docked to the platform (open bottles do not need to pass through existing capping systems).

**Exterior cladding.** Free-standing, makrolon or glass exterior cladding / advantage: unobstructed view of all machine components / dirt and deposits can be seen immediately from the outside / sufficient access area for cleaning and maintenance / basic exterior cladding can be upgraded to a closed sanitary room.

**Timesaving.** Rapid intermediate rinsing and cleaning processes during product change / lines are installed with a slope to ensure quick emptying of the product passages / advantage: significant time savings for frequent changeover / in addition, reduced time for machine installation and initial operation.

**Diagnostic system.** Optionally, reference filling valves can be equipped with pressure sensors that continuously record the pressure curve during a filling process and send it to the display screen. This has the advantage that



the process sequence can be monitored permanently even inside the bottle. The vacuum actually achieved in the bottles and the correct CO<sub>2</sub> purging process can be read, among other things.

This is an important aspect in order to ensure low-oxygen filling.

**Operator panel.** The new multiple-award winning KHS operator panel (Red Dot Award & iF Award) with integrated RFID system controls the platform system.

**Conclusion:** Innofill Glass rings in a new area in filling technology. The platform offers maximum transparency and cleanliness while ensuring even greater product safety. Oriented towards the requirements of the brewing trade to be able to fill beer pasteurized by a flash pasteurizer under optimal hygienic conditions without the need for bottle pasteurization after the filling and capping process, KHS' development experts have done a perfect job. Light artist Michael Batz sees it this way: "It is neither the wind nor the sun – thinking is the largest renewable energy source."

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