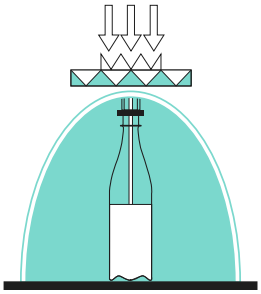
Innosept

Aseptic Cold Filling ACF – Dry Sterilization



KHS Alfill

ACF* – The Future Technology –

Offered by KHS Alfill Today!

ACF = Aseptic Cold Filling

KHS Alfill

*ESL = Extended shelf life

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Taking the Lead by Setting the Trend

The trend towards healthy nutrition develops the markets of the future. Natural products are in demand. Sport, energy, fitness, wellness are terms that stimulate consumption.
More and more non-carbonated beverages and sensitive products are being offered in plastic bottles. Innovative ideas are needed in order to fill these products aseptically safely and economically.
KHS has developed and convincingly put these ideas into practice.
With its latest generation of dry bottle and cap sterilization with H_2O_2 and the wet sterilization method with peracetic acid, KHS offers two modern and reliable systems in its ACF program.
From a hygienic safety standpoint, both methods definitely behave identically. The decision in favor of dry or wet sterilization can be made individually based on prevailing operating conditions. This includes the quality of the bottles and closures, their conveying conditions, and of course the range of beverages to be filled.

While dry sterilization is convincing on the one hand due to the additional cost-cutting aspect of using less rinsing water for bottle and closure treatment, the wet method on the other hand is compelling in particular because of the bottle and closure rinsing process.
The dry sterilization method is the preferred method if the user can guarantee that the containers supplied are dry and free of particles.
The ACF technology from KHS provides you maximum production and product safety and creates the ideal conditions for aseptic filling of non-carbonated mineral water, fruit juices and fruit drinks, iced tea and wellness drinks, as well as dairy and mixed milk drinks for today's products and tomorrow's markets.
It is even possible to bottle carbonated beverages such as spritzers.This means a safeguard for the future for new product developments as well.

Aseptic and ESL Products –

A System Concept for Tomorrow's Markets

KHS Alfill

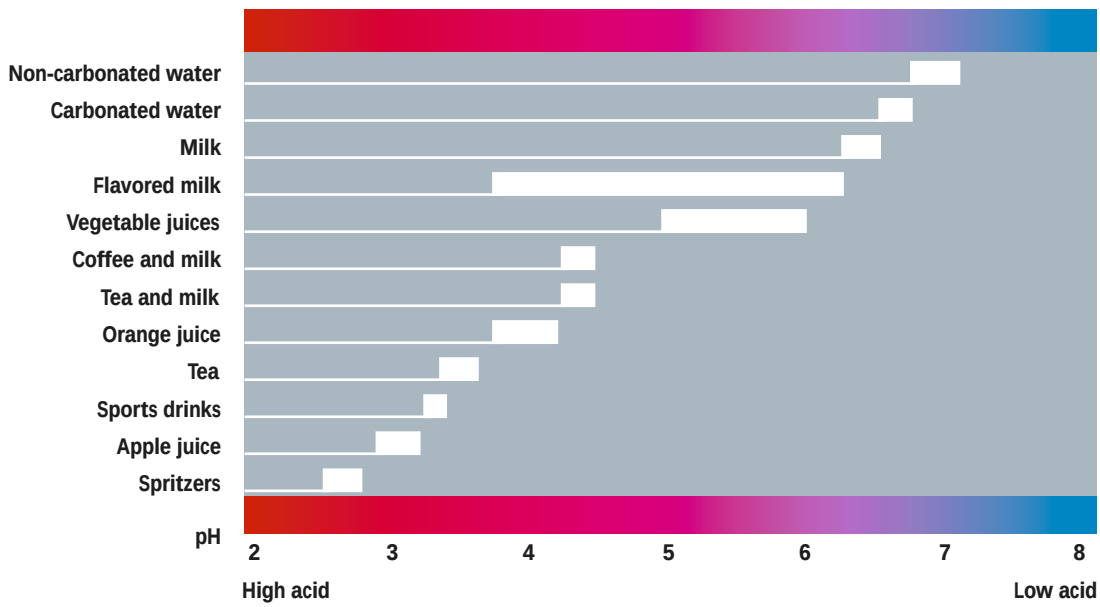
Cold aseptic filled products are capturing markets.
Thanks to these advantages:

- Preservation of product naturalness.
  No loss of valuable ingredients and flavors.
  No preservatives.
  No degradation of quality caused by hot filling.

- All shapes of attractive, lightweight, inexpensive plastic bottles can be processed.
  The focus is on popular convenience characteristics and cost benefits.

- The Innosept ACF dry sterilization method using hydrogen peroxide (H_2O_2), a mini-isolator for the sterilizer, activator, and filler as well as cap sterilization and an aseptic capper are special technical features from a sole source. Available exclusively from KHS Alfill.
  You save on the cost of investment, fresh water, and wastewater in addition to saving space.
  You can process a wide variety of products on a single KHS Alfill ACF line.
  Pure flexibility!

Spectrum of pHs of beverages to be filled



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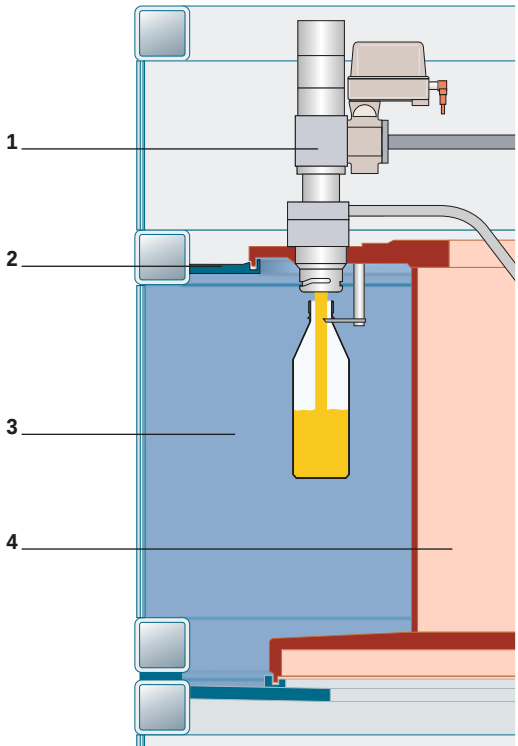
KHS Innosept ACF Dry Sterilization –

A New Dimension in Aseptic Cold Filling. Exclusively from KHS, Worldwide!

- Patented method of dry bottle and closure sterilization.
  Reliable and proven H_2O_2 technology.
- Drastic decrease in operating costs.
  No water consumption for the bottle sterilization process; no wastewater.
- Minimal sterile zone for the entire process.
  Mini-isolator technology for bottle sterilizing and filler/sealer.
- Trend-setting concept for compact and hygienic machine design.
  Small footprint, optimum use of floor space, ease of operation, effective cleaning and disinfection.
- High biological safety and reliability.
  Ideal for non-refillable PET and HDPE containers

Sterile room and mini-isolator

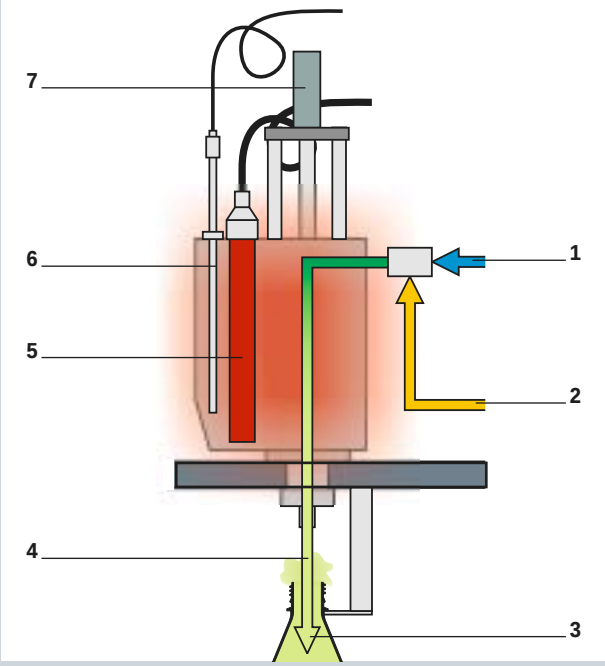
1 Filling valve
2 Stationary filler zone
3 Mini-isolator
4 Rotating filler zone



A Revolution! Plastic Bottle Sterilization Entirely Without Water –

Take Advantage of the Cutting Edge of KHS Alfill Technology

KHS Alfill



H_2O_2 vaporizer
1 Sterile air
2 Liquid H_2O_2
3 Gaseous H_2O_2
4 Retractable rinsing tube
5 Electric heater
6 Temperature control
7 Purging-tube lifting mechanism

Hydrogen peroxide (H_2O_2) and warm air are used for sterilization. A proven method that has been used in cardboard box processing for decades.
KHS Alfill now enables you to take advantage of this safe and successful method for processing plastic containers.

The KHS Alfill dry sterilization method involves heating a mixture comprised of an H_2O_2 concentrate and sterile air by means of a vaporizer. The resulting gaseous mixture is applied to the interiors and exteriors of the containers. The difference in temperature causes the gas to condense on the container walls.
All surfaces are moistened.
Flawlessly.

During the course of processing, warm air activates the sterilization process and eliminates any moisture remaining on the container walls. All surfaces are thus sterile and dry.
This method requires less energy. You save on the cost of water, water treatment, and wastewater in addition to sterilant.

You can process all bottle styles regardless of the shape and size. Even undercuts and difficult to access hollow spaces such as the handle areas of plastic decanters are reliably treated and sterilized.
Great flexibility and creativity in the design of your unique containers styles.

Innosept

Greater Freedom for New Product Ideas –

The New KHS Alfill ACF Generation with H_2O_2 Sterilization

Special features that set new standards in aseptic cold filling:

- Compact isolator technology for sterilizer, activator, and filling valve areas.
  Minimal sterile areas – a KHS Alfill patent.
  Saves time and effort.
  Can be used for all styles of plastic bottle, regardless of shape and size.

- Full microbiological safety coupled with compelling economy.
  Drastic reduction in sterilization operating costs in comparison to conventional methods.

- Modular design system. Optionally high-performance linear or rotary fillers.
  Great flexibility. The right solution for all capacity ranges.

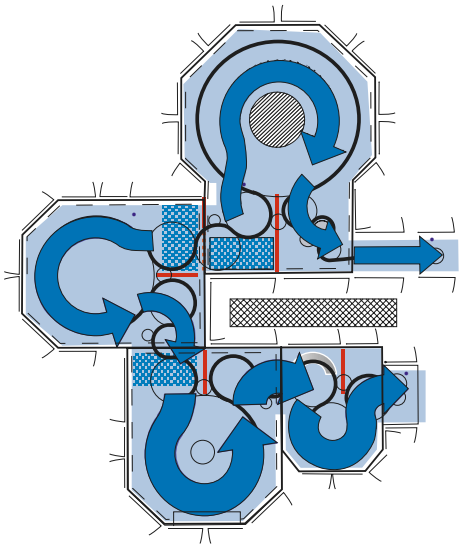
- Product and container changeover without format part changing. Stainless steel infeed disk. No plastic feedscrews.
  Maximum machine flexibility and readiness for use.

- Hygienic design – roof-like machine tables and forced runoffs. No corners, recesses, or niches.
  Highest standard of hygiene as prerequisite for aseptic cold filling.

Innovative air management. The air is sterilized – highly pure, class-100-compliant – in special HEPA filters*, then forced through a patented system of baffle plates in separate air filter circuits towards the bottle infeed and discharge, from where it is specifically disposed of through an exhaust pipe system.

Advantages: Assured controllable air process for a sterile air atmosphere; minimum cost of sterile air and high process hygiene.

Air control in the aseptic block



*HEPA filter = high efficiency particulate air filter

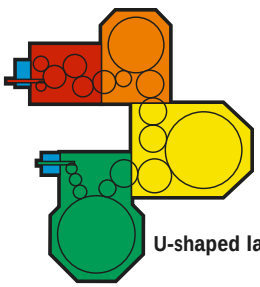
The Heart of KHS Alfill ACF Technology –

Innosept, the Modular Concept System

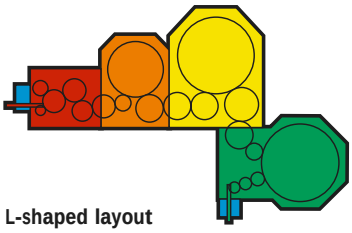
- Dry bottle sterilization inside and out, dry closure sterilization – all with the H_2O_2 method.
  Safe complete packaging sterilization.
- Patented mini-isolator technology (mini sterile chamber) filling process.
  Perfect sterilization of bottles and closures.
- Neck handling maintains continuous bottle flows.
  Free choice of bottle sizes and shapes.
  Great freedom of bottle design.
- Completely sterilizable filling system with cutting-edge filling technology.
  Microbiological safety down to the very last detail.

- Automatic sanitizing and disinfection of all surfaces in the sterile zone. 360-degree spray nozzles.
  Perfect process hygiene.
- Air flows directed away from critical towards non-critical areas.
  Safety also at the transition points between sterile zones and the surrounding area.
- Innovative sterile air lock system with barrier effect in the entry and exit zones.
  Controlled sterile air management.
- All drives and controls are located outside the sterile zone.
  Unlimited access during production.
- Complete stainless steel design.
  Long service life.
- Integrated CIP/SIP systems.
  Biological safety for all line components and production paths.
- Continuous process data acquisition and complete recording of all parameters.
  Complete control and documentation of the entire filling process.
- Modular system concept.
  Flexibility in line planning, optimum utilization of existing space.

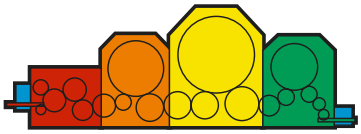
Layout options (modular system)



U-shaped layout



L-shaped layout



I-shaped layout

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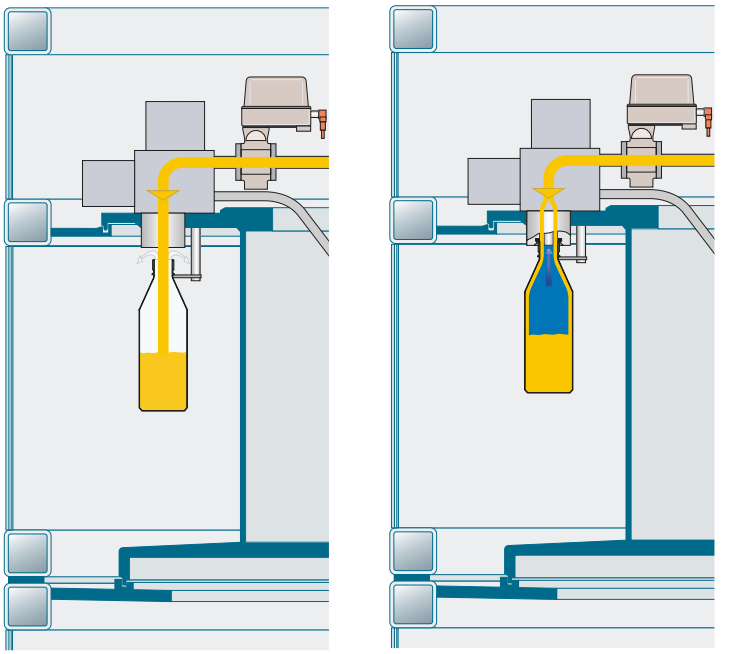
Precision Down to the Last Bottle –

For Carbonated and Non-carbonated Beverages



Optional: Combined filling system for bottling carbonated (left) and non-carbonated beverages (right).

- The computer-controlled volumetric filling method ensures exact filling volumes.
  Product savings.
- Absolute non-contact filling of non-carbonated beverages. No built-in parts, no valve components extending into bottles.
  Best prerequisites for aseptic filling.
- Combined filling of carbonated and non-carbonated beverages (option).
  Flexibility in the range of applications.
- Computer-controlled filling process.
  Continuously documented optimum filling parameters.
- Hygiene-compliant valve design. Functions activated by aseptic membranes. No guides and springs in the product area.
  Easy to service. Optimum CIP/SIP conditions.
- Fully automatic CIP/SIP capabilities.
  Preprogrammed sanitizing and disinfection measures.

Advanced electronic volumetric filling systems from KHS have been in operation successfully worldwide for many years. All prerequisites for aseptic filling are met.

Getting into the Thick of It –

By-weight Dosing Filling System

KHS Alfill

For all products of varying consistency.
From low viscosity to pasty.
Products such as:
– Mixed milk drinks
– Pulpy beverages
– Products containing cereals or pieces of fruit
– Yogurt drinks
– and many more

- Weighing system
  High filling accuracy.
  Ideal for weight contents that need to be specified on the packaging

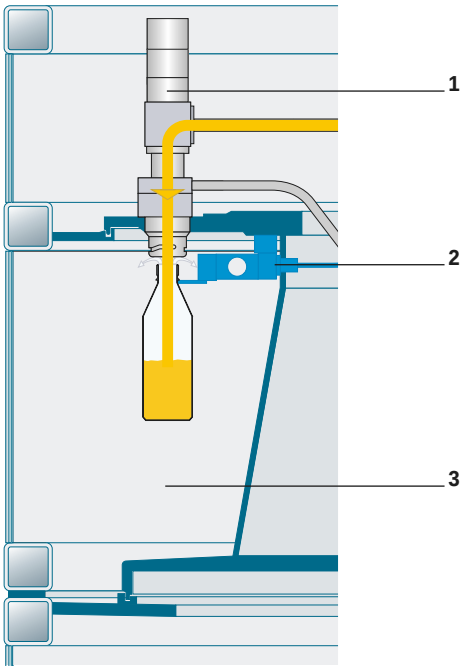
- Computer-controlled, self-regulating filling process.
  Exact filling. Product savings.

- Non-contact filling
  High hygienic safety.

- Bottling system for all shapes and types of plastic bottle.
  No format changing if bottle mouths are the same.
  Flexibility of system utilization

- Neck handling from the bottle infeed to the bottle discharge.
  Gentle container control.

- Optional:
  Bottling of several products simultaneously.



By-weight bottling system in the mini-isolator.
1 Filling valve
2 Weighing cell
3 Mini-isolator

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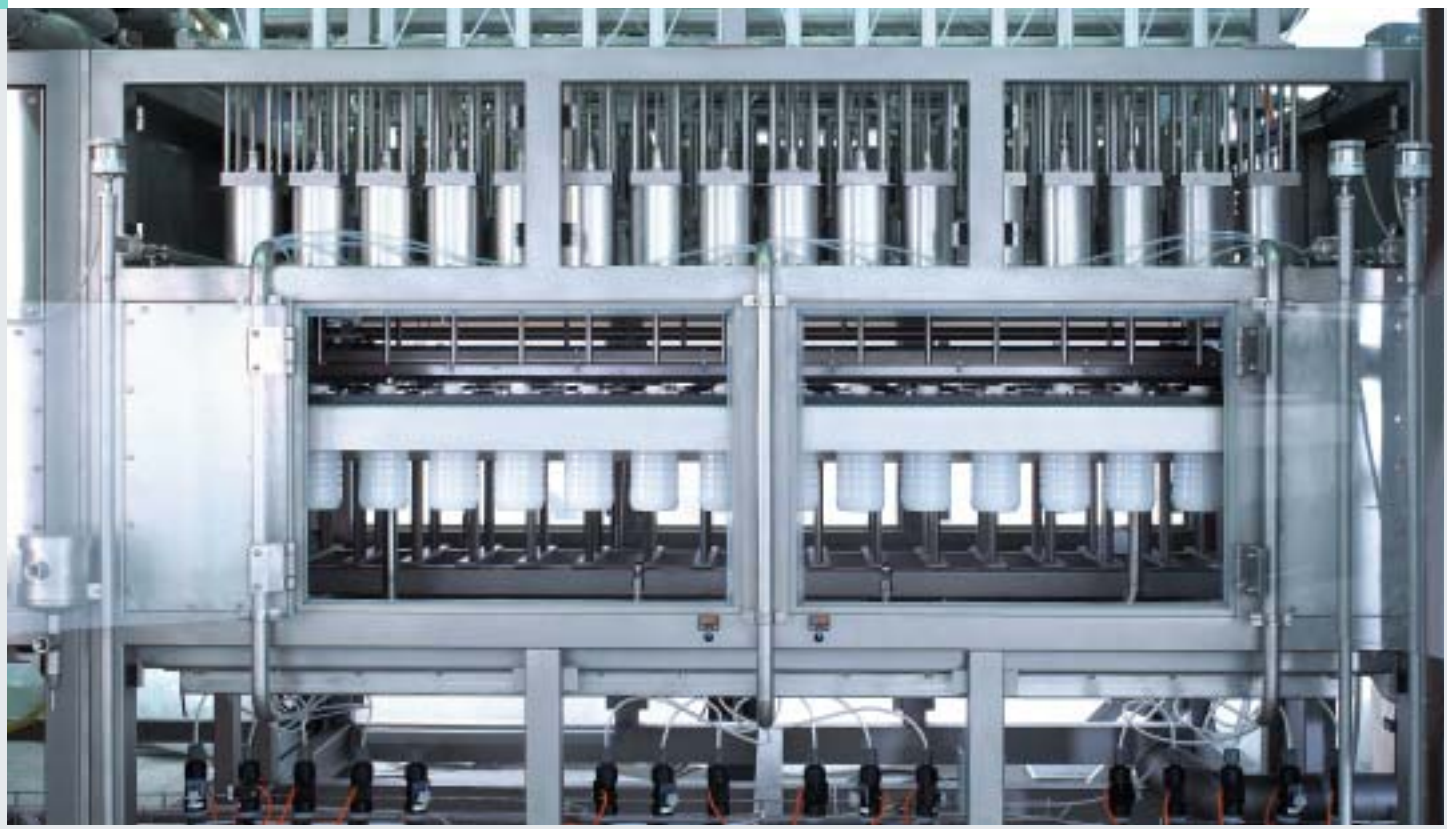
All-in-One Solution

Innosept LINEFILL – The Compact Linear Filler Solution at up to 6,000 Bottles/h

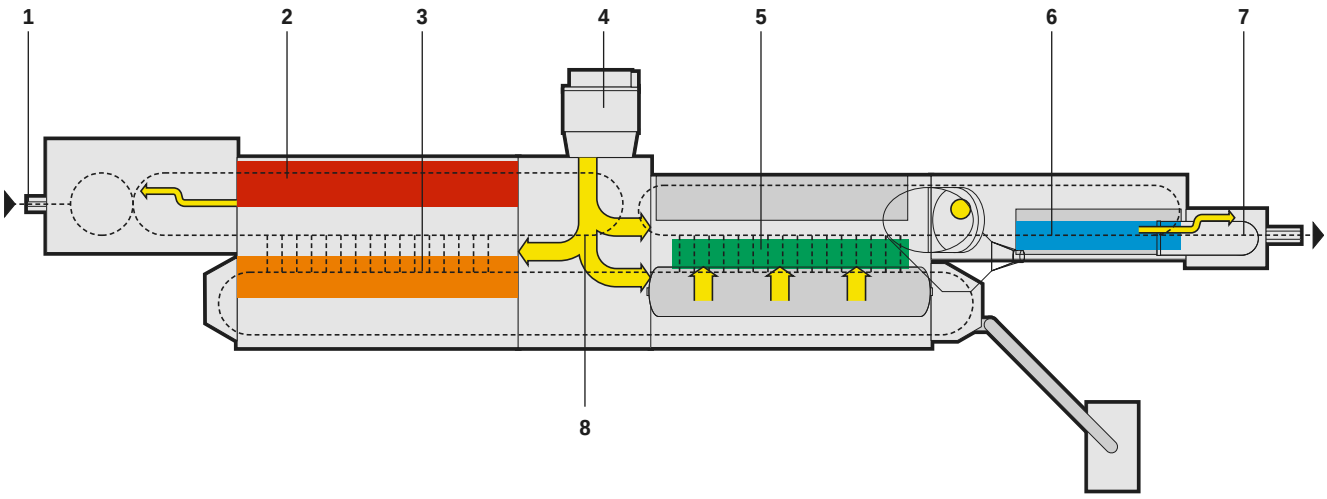


- Linear filling concept for plastic bottles.
  For all bottle shapes and sizes.
  Capacity range of up to 6,000 bottles/h.
  Great flexibility coupled with highly economical operation and added benefits.

- Non-contact filling of non-carbonated beverages.
  Filling system free of moving parts and filling tubes.
  Fewer wear parts.
  Less servicing.
  High aseptic safety.

Linear filling block

1 Bottle infeed
2 Sterilizer
3 Activator
4 HEPA filter
5 Filling valves
6 Capper
7 Air lock
8 Sterile air control



KHS Alfill

- Mini-isolator technology for bottle sterilizer and filler/sealer.
  Minimal sterile zone for the entire process.
- H_2O_2 process of dry bottle and closure sterilization.
  With all of the advantages of a rotary filler.
- Compact machine design.
  Space savings.
- Neck handling from infeed to discharge.
  Gentle bottle conveying.
- Automatic CIP program for sterilizer and filler
  Maximum hygiene safety
- Push-of-a-button product changeover.
  Time savings and flexibility.
- Smooth surfaces free of niches and corners.
  Fulfills maximum hygiene demands.
- For ESL and ACF filling.
  Optimum adaptation to your product requirements.
- Optional:
  Bottling of several products simultaneously.

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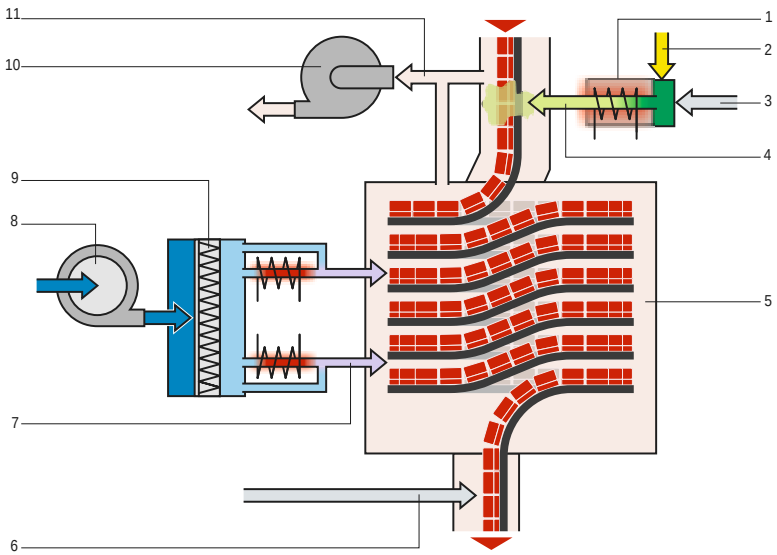
Sterile at a Low Price –

Perfect Screw-cap Sterilization



Innosept closure sterilization.

1 H_2O_2 vaporizer head
2 Liquid H_2O_2
3 Sterile air
4 Gaseous H_2O_2
5 Sterilization drum
6 Sterile air cap cooling
7 Hot air drier
8 Fresh air blower
9 HEPA filter
10 Exhaust blower
11 Exhaust air

- Patented KHS Alfill method of hydrogen peroxide (H_2O_2) sterilization. All surfaces covered entirely with condensate. Regardless of cap shapes and materials.
  Reliable sterilization of the entire cap.

- Dry sterilization process.
  Drastic costs savings.
  No water, less energy consumption.

- High output
  Up to 50,000 caps/h for 28-mm or 38-mm cap diameters.
  Adaptation capabilities to all line sizes.

- Reliable process without affecting cap properties.
  No lubricant washout.

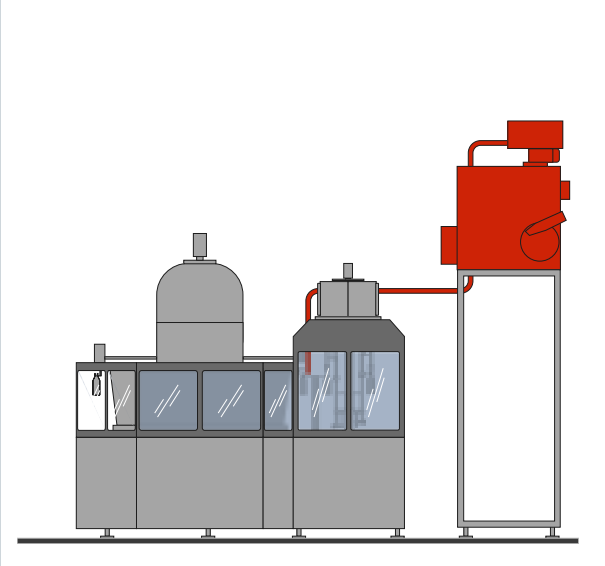
- Non-contour and non-shape-dependent.
  Dimensional stability and exact fit of caps unaffected even during machine standstill.
  For all one-piece and composite closures and sports caps.
  Wide range of applications, great flexibility.

- Efficient air management.
  Extraction of H_2O_2 vapors.
  Low sterile air consumption.

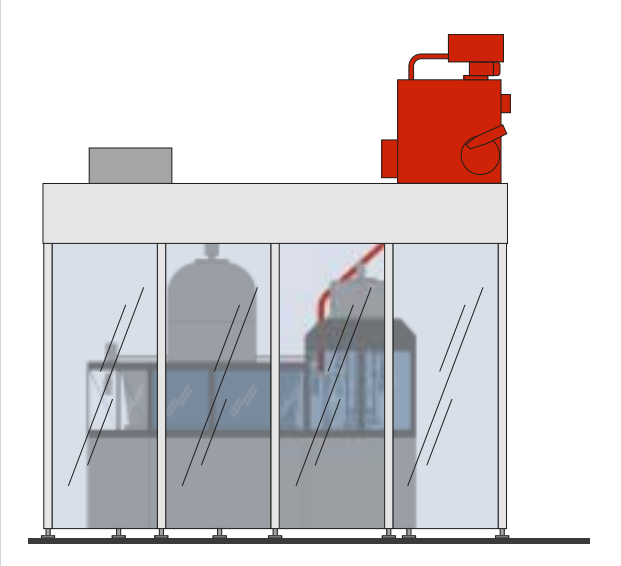
- Can be integrated into the bottling line CIP/SIP sanitizing intervals.
  Maximum hygienic safety.

- Small, compact design. Made entirely of stainless steel.
  Fits in all bottling lines. Can be integrated between the sorter and the capper.
  Also suitable for retrofit in existing lines, even those from other manufacturers.

Closure sterilizer installed on a separate base frame



Closure sterilizer integrated into an ACF filling block



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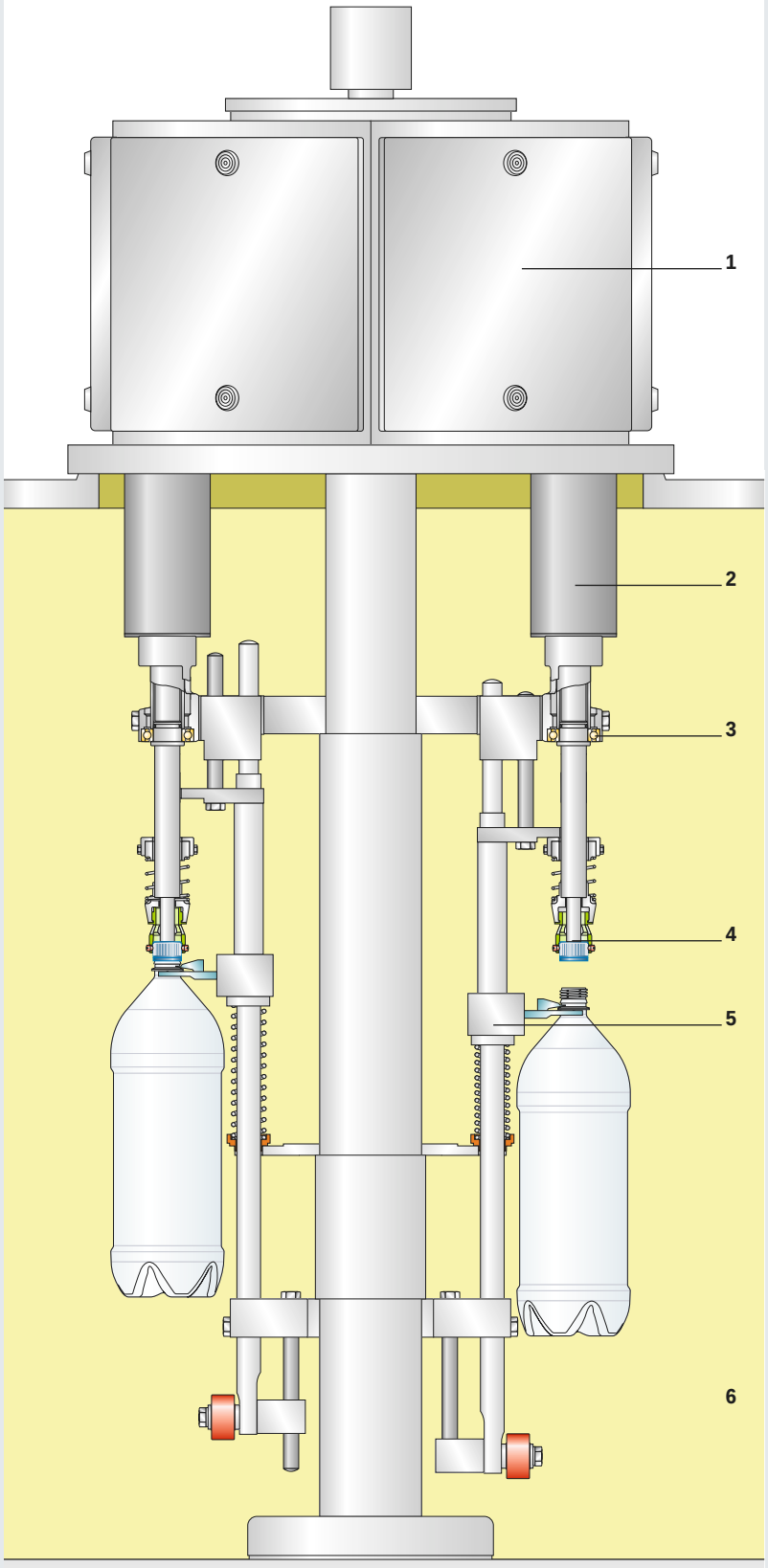
Innofill SV Aseptic Screw Capper –

The *Mister Clean* of Cappers



- Entirely different mode of operation versus conventional cappers.
  Stationary capping spindle. No vertical motion.
  High stability. Little wear. Low-cost operation and maintenance.

- Slender center column with additional nozzles for inside cleaning behind the capping spindles.
  Highest-level hygiene safety.

- Caps are transferred from the cap chute to the capping head by a transfer star and ramp.
  Reliable, fast mode of operation.

- On top – the central computer.
  The electronic equipment is located outside the isolator zone.

- Bottle positioning by a lifting cam, lifting rod with a spring, and bottle neck platform.
  Gentle, short-stroke bottle motions.

Layout of the Innofill SV screw capper

1 Control	**4 Capping head**
2 Servo drive	**5 Bottle lift mechanism**
3 Open bearing	**6 Sterile zone**

Constructed in KHS Hygiene Design –

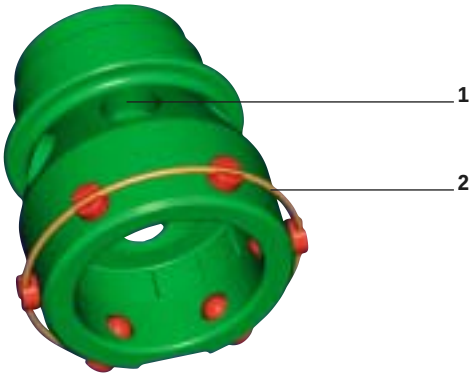
No Lubrication in the Sensitive Bottle Mouth Area

KHS Alfill

- Open-type design of all components. Capping elements with flushing openings and exposed clamping collars. Pins instead of locking balls to hold caps in place.
  Reliable, automatic exterior sanitizing and disinfection.
  Microbiological safety

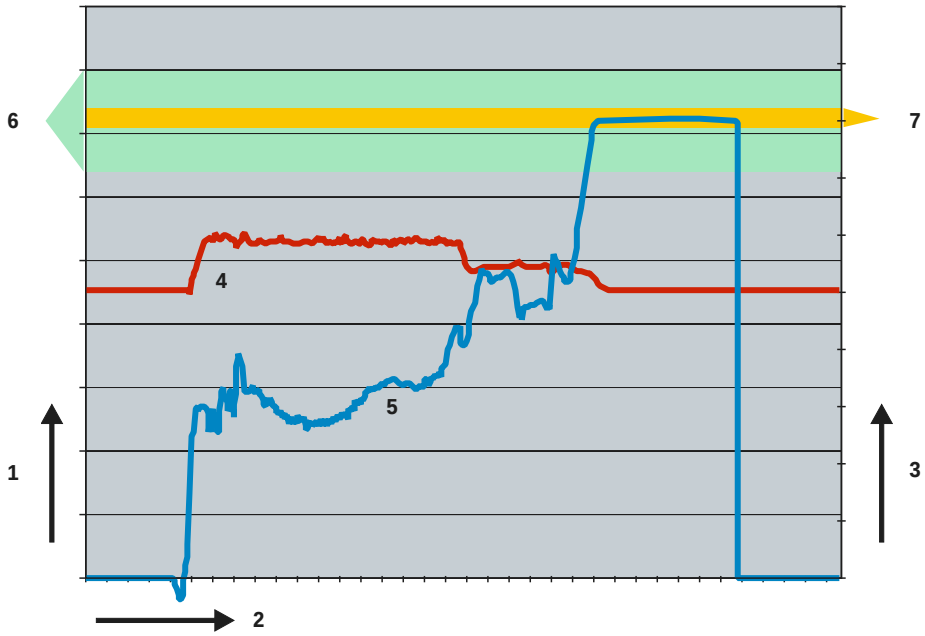
- Fast changeover to other screw cap styles and diameters.
  High machine availability.

Capping head
1 Flushing opening
2 Exposed clamping collar



Speed and torque curve during the capping process

1 Speed
2 Capping distance
3 Torque
4 Speed curve
5 Torque curve
6 Capping torque tolerance range of conventional screw cappers
7 Capping torque tolerance range of the KHS Innofill SV screw capper



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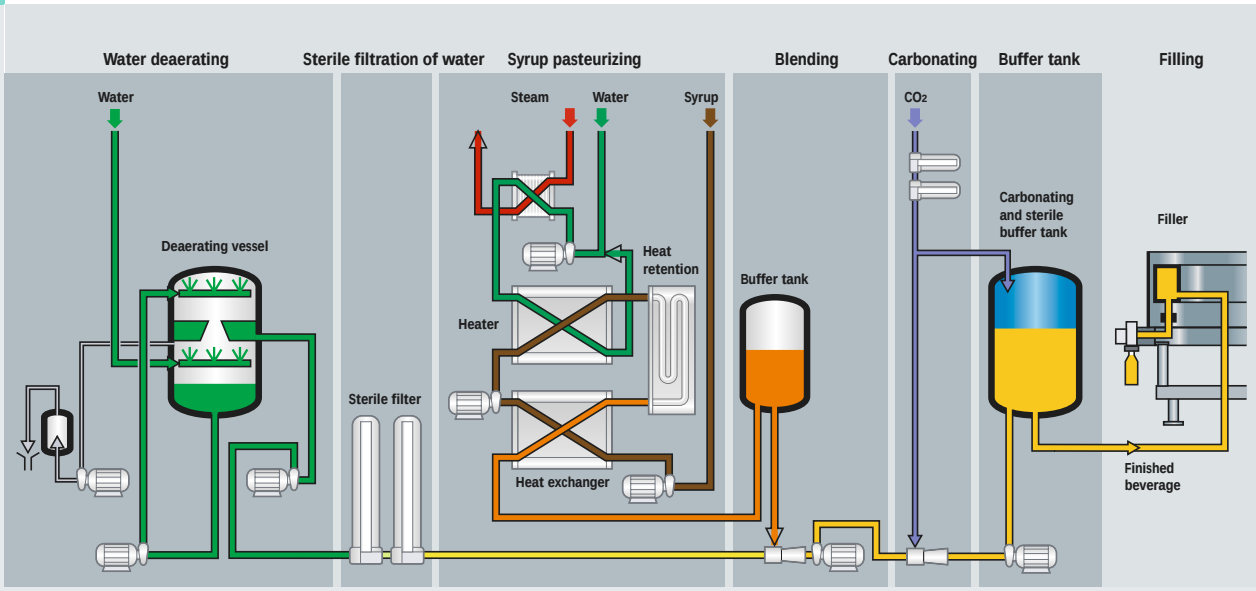
From the Raw Product to the Capped Bottle –

Complete ACF Technology



Innopro ASEPTOMIX Blender

- Layout of process engineering according to customer and product-specific requirements.
  Flexibility of system utilization
- Sugar management, syrup room, deaerating, blending, UHT*/FP**, sterile buffer tank – all from KHS.
  Perfect orientation of all process modules to ACF requirements.
- Aseptic valve and sensory equipment matched to the process.
  CIP/SIP capabilities, product assurance.
- Thermal beverage treatment
  Reliable product pasteurization.
- Use of sterile buffer tanks.
  Continuous availability of sufficient quantities of product and thus a constant supply to the filler.
- Integrated CIP/SIP systems.
  Basis for a high standard of hygiene.

***UHT = Ultra-high temperature**
****FP = Flash pasteurizing**

Microbiological Safety –

CIP/SIP Technology with Sanitizing and Disinfection Cycles

KHS Alfill

- Integrated CIP/SIP functionality.
  Safety for all line components and production paths.

- Automatic sanitizing and disinfection of all surfaces in the mini-isolator.
  Prerequisite for consistent sanitizing and disinfection results.

- Short interim disinfection carried out automatically at defined intervals; main sanitizing for each product changeover or at prespecified intervals.
  Safety has priority.

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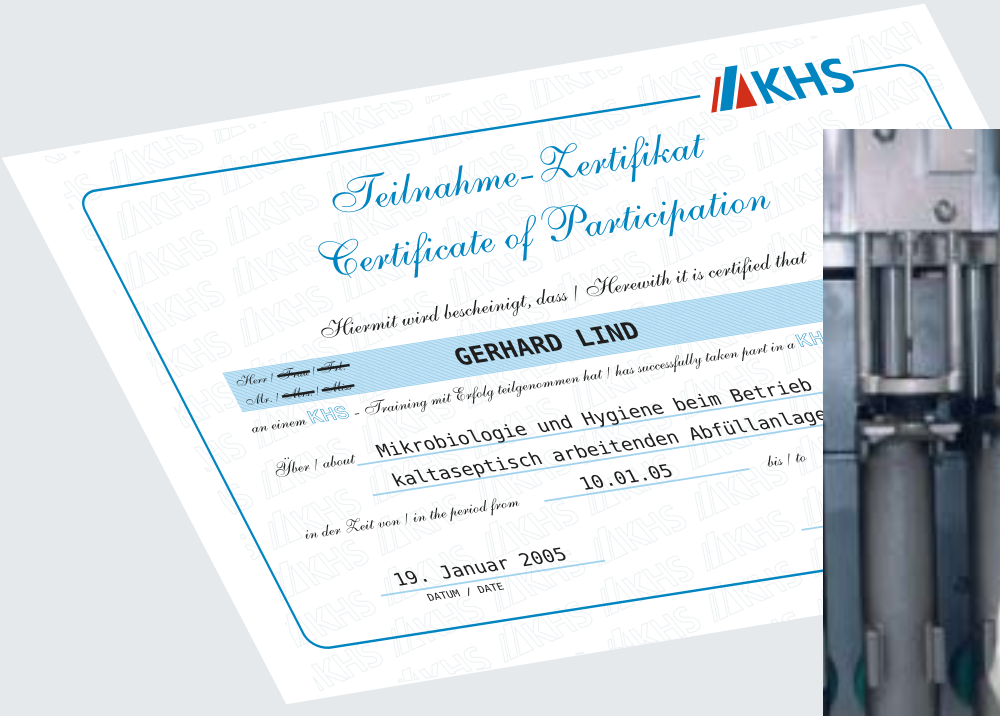
Validation – Acceptance – Support –

KHS Is and Remains Your Partner

- Training in system hygiene and aseptics for
  – machine operators and maintenance personnel
  – quality assurance and plant inspection
  – knowledge transfer.
- ACF handbook on proper conduct in the area of and operation of aseptic systems oriented to customer-specific conditions.
- Always up-to-date on the state of the art of ACF technology.
- Mobile laboratory facilities available.
- Preparation and execution of microbiological validation and acceptance.
- Advice regarding microbiological and hygiene issues and consulting on the layout and operation of aseptic systems.
- Preparation of sampling plans and assistance in the preparation of HACCP* concepts in the product area.
- Validation and spray shadow tests, sample-taking at all machine components – repeated sampling – and examination of filling results.
  Extensive microbiological inspections.



*HACCP = Hazard analysis and critical control points

AIS – KHS Plant Information System –

A Must for Aseptic Filling

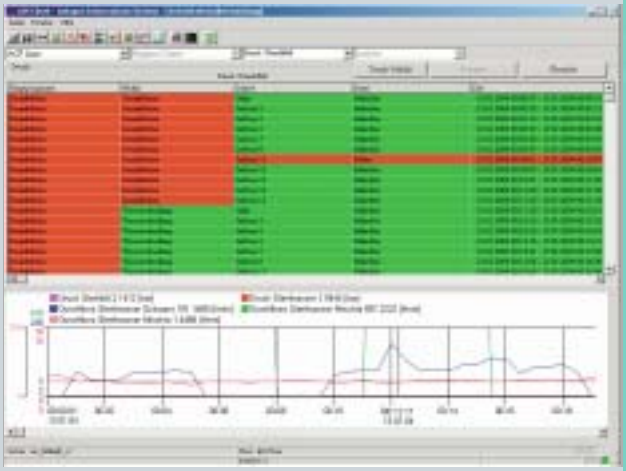
KHS Alfill

- Clear, simple operator prompting.
  User-friendly. Clearly arranged. Perfect information on current system statuses.

- Fast communication with permanent feedback between machine operator, control, and system.
  Reliable line operating.
  Immediate reaction to deviations in target data, assured adherence to all beverage-aseptic parameters.

- Online monitoring of critical control points (CCP).
  Consistent control, systematic and permanent monitoring of all beverage-aseptic process parameters.
  Comprehensive information on completed and on-going processes. Maximum safety during sanitizing, sterilizing, and production.

- AIS system to record disruption data, production statistics, log aseptic data, and document process flows.
  Continuous transparency of beverage-specific product quality and line efficiency.



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