

ABF 4C

ABF 4C is the Ultra clean version of the Blow-Fill machine. A customized sanitization of the preforms together with a specific caps treatment, ensures that the ABF 4C is able to satisfy any clean production need (i.e.: Extended Shelf Life milk, Carbonated Juices, ...)



ABF - The concept

Sterilizing the preform instead of the bottle reduces the quantity of sterilizing agent used as the preform is smaller and has a more simple shape than the bottle itself. As the preform is made of thicker material than the bottle itself it's possible to increase the temperature of the treatment without risk of shrinkage that would affect the shape of the bottle. This allows the weight of the bottle to be reduced compared to traditional aseptic systems. ABF provides flexibility, sustainability and space saving. ABF is an extremely flexible system that can blow and fill up to 48,000 bottles

per hour and operate at different levels of decontamination appropriate for each product. This allows products with different shelf-life - low-acid aseptic beverages, high-acid aseptic beverages, ESL beverages, water, etc. - to be produced on the same system. ABF can be used for ambient or cold-filling operations. The system uses almost no chemicals and water. Energy usage is kept to a minimum by the elimination of air conveyors, sterilization and rinsing carousels, water UHT sterilization. The whole system is more compact than traditional technology and requires fewer operators.



ABF - Fillstar aseptic filler

below the sterile zone. All surfaces in the sterile zone are accessible and are very easy to clean. The sterile preforms are blown with sterile air. The sterile bottles are then turned into the upright position and transferred to the Aseptic Filling carousel.

ABF uses GEA Procomac's Fillstar volumetric electronic filler (FX/CX) fitted with magnetic flow meters: an industry standard for filling sensitive beverages. The bottles are neck handled throughout filling and capping. The Fillstar can fill any beverage including products with pulps, fibres or fruit pieces.

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GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

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GEA Procomac ABF Aseptic Blow Fill

A new concept in aseptic filling

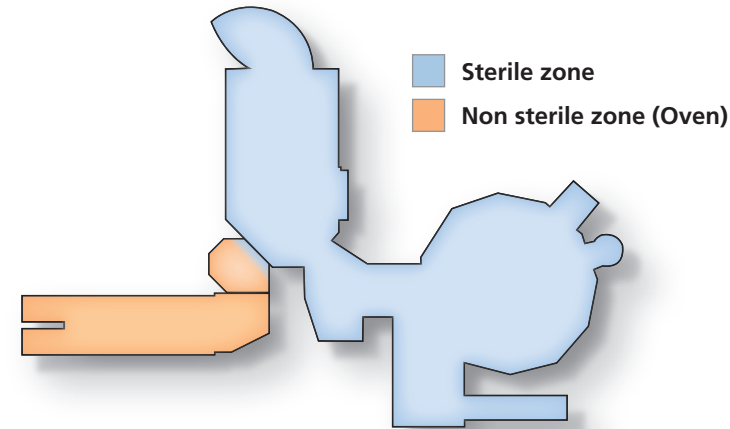
engineering for a better world

Aseptic Blow Fill

ABF - Airstar technical aspects



Aseptic Blow Filling (ABF) is a complete new concept for aseptic filling: it's the world's first rotary aseptic blow moulding machine with an integrated aseptic filler and capper. The principle is to sterilise the preform with Vaporized Hydrogen Peroxide (VHP) at the exit of the oven; then blow the preforms with sterile air in a sterile environment and maintain this sterility throughout the filling and capping process. Achieving this minimises the use of chemicals, requires no bottle rinsing, enables a simpler and smaller layout and reduces energy consumption.



Designed by competence

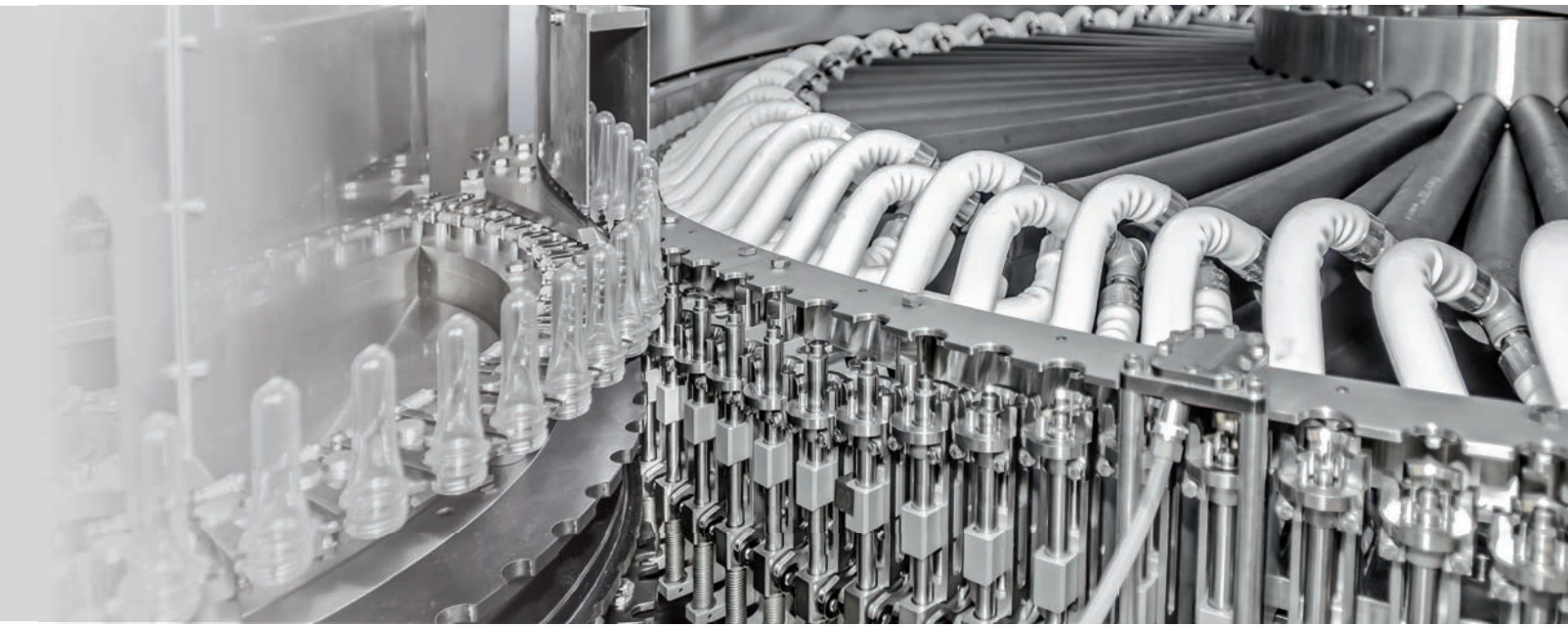
AIRSTAR, the world's first rotary aseptic blow moulder, was designed by GEA Procomac from a clean sheet, using the know-how GEA Procomac has gained through many years of designing aseptic lines, to meet the most stringent aseptic requirements.

A key design decision was to blow the preforms 'upside down', enabling all non-cleanable components to be located outside the sterile zone. This inversion is performed immediately after the pitch wheel thereby optimizing the heating process in the oven. With this solution the neck is easily kept cool by the air flow generated inside the oven by the fans. The heating is performed by infra-red lamps, controlled

by specific power control modules. The inlet zone and the oven are located outside of the sterile zone.

After the treatment in the oven, the preforms enter the sterilisation wheel where they are sterilized by VHP treatment. The sterilizing nozzle, with the "upside down" position of the preform, delivers a strong dedusting combined with the sterilization process.

A preliminary dedusting phase is performed just before the inlet of the blower to remove any gross particles inside the preforms.



ABF - Airstar aseptic blow moulder

AIRSTAR is the first truly aseptic blow moulder and it is an integral part of the ABF system. It was designed by GEA Procomac to have asepsis as a core concept from the beginning. The preform VHP treatment sterilizes the internal and external surface of the preform using a flow of Vaporized Hydrogen Peroxide at controlled temperature and concentration. This achieves a preform sterilization performance of up

to 6 log reduction. In the final stage of the sterilization process, the preform enters the Sterile Zone, where the blowing wheel is located. A key design decision was to blow the preforms "upside down", enabling all non-cleanable components to be located outside the sterile zone. Electrical components are located above the sterile zone. Mechanical components and all components that require lubrication are located

Preform VHP treatment

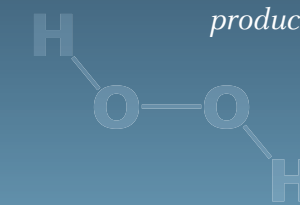
The preform VHP treatment sterilizes the internal and external surface of the preform using a flow of hydrogen peroxide in vapor phase at controlled temperature and concentration. In the final stage of the sterilization process, the preforms enter the Sterile Zone, where the blowing wheel is located. Everything inside this zone can be cleaned by foaming and sterilized by a sterilization cycle (SOP) with VHP, performed before starting every production cycle. The active pressure modules and the modulating exhausters control the flow of air, sterilized by HEPA filters. This ensures the sterility of the environment which is maintained continuously in sterile air overpressure. Hydraulic seals, gaskets and bellows keep the Sterile Zone separate from the outside "dirty" environment.

The blowing process

The blowing process of the sterile preforms is performed with sterile air; this requires both the use of micro-filtration for the sterilisation of the air and the sterilization of the piping with VHP. For this reason GEA Procomac developed a specific air blowing block that can be sterilized keeping at the same time reactivity, reliability, "reduced pressure drop" and "reduced dead volume".



“ The internal surfaces of the blower can be cleaned by foaming and sterilized by Vaporized Hydrogen Peroxide before starting the production cycle ”



Sterile stretching rod [patented]

All the parts that touch the preform and/or the bottle have to be sterile before starting production and therefore it is mandatory to have a sterile stretching rod. The GEA Procomac system (patent pending) allows the stretching rod to be kept inside a sterile housing, sterilized with VHP. The movement is forwarded by a magnetic joint between two magnets: an internal one connected with the stretching rod inside the housing and an external one connected with a standard moving system by cam and pneumatic actuator or linear motor. This also provides the benefit of allowing the automatic disengage of the magnets if jamming of the preform occurs during the stretching phase.

Locking system [patented]

Several features of the ABF also have patents pending. One of the most interesting is the new moulds locking system. Two rings have a symmetrical movement and lock the two moulds together. During the blowing process the pressure will be distributed to the rings without the need of a pneumatic compensation system. This reduces the number of components, minimizes air consumption and especially avoids the need to sterilize the "narrow" compensation chamber.

Sterile process continuity

The sterile bottles, after being turned into the upright position, are transferred to the Aseptic Filling carousel without leaving the sterile zone. The blow moulding machine and the filler are synchronized electronically and not through shaft.

Change-over

Change-over of the moulds is performed in a specific isolated area under a laminar air flow generated by an active module with HEPA filters. A moulds assembly system allows the operator to change moulds easily. After the change-over it is performed a rapid cycle of sterilization with VHP before aseptic production is restarted.

