TECH-LONG



Aseptic Blowing-Filling-Capping Combi-Block with Preform Chemical Dry Sterilization



ENERGY CONSERVATION, EMISSION REDUCTION, CONSUMPTION REDUCTION

have become the development direction of the industry.

In today's world where environmental protection concepts are increasingly becoming a global consensus, beverage production companies urgently need a packaging disinfection process that can ensure product safety, reduce pollution, save energy, and balance economic benefits.

Tech-Long is well versed in this field and has successfully developed a preform chemical dry sterilization solution based on industry-leading and stable bottle blowing machine technology, providing a new choice for green and efficient production in the industry.

Respecting Aseptic Design and Pursuing Details
- The Craftsmanship of Tech-Long Aseptic Design and Manufacturing








Tech-Long's industry-leading blow molding technology provides technical support for the development of preform dry sterilization aseptic equipment

The first in China
Fill the domestic manufacturing gap of high-speed automatic rotary blow molding machine

National standard drafting unit

National Intellectual Property Demonstration Enterprise

2100+
sales volume of bottle blowing machines

Tech-Long PET automatically rotary blow molding machine began in 2002, After more than 20 years of development, Tech-Long has forged its high-speed, stable, and energy-saving bottle blowing technology.

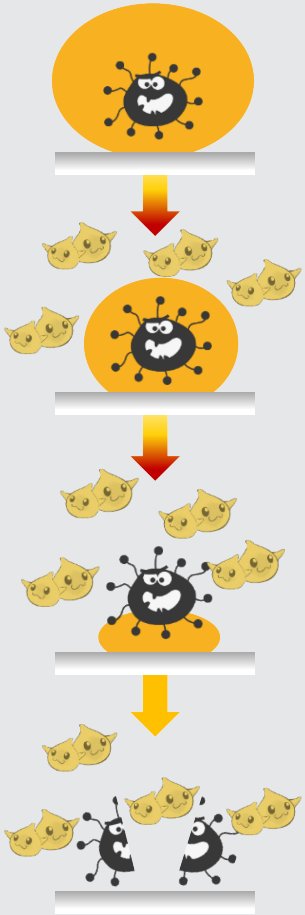
Tech-Long's industry-leading blow molding technology has laid a solid foundation for the innovation and development of preform dry sterilization aseptic equipment.



(Vaporized) Hydrogen peroxide is widely used in the field of packaging sterilization
The sterilization is safe and reliable







H2O2 solution is sprayed on surface or H2O2 vapor condenses on the surface.

Bacteria cell is covered and sealed.

H2O2 solution has low killing efficiency.

H2O evaporates due to lower evaporation temperature than H2O2.

H2O2 conc. Increases(25%→85%).

Under light or heating conditions, hydrogen peroxide decomposes to produce active free radicals (such as hydroxyl radicals ·OH).

Killing effect increases.

Effective killing process starts.
Hydrogen peroxide damages cell walls through oxidation; it inactivates enzymes containing SH groups; and active free radicals can cause DNA damage.

Cells are killed completely

Efficient sterilization without the need for rinsing

$$H_2O_2 \rightarrow 2HO\bullet$$

$$H_2O_2 + 2HO\bullet \rightarrow HOO\bullet + H_2O$$

$$HO\bullet + HOO\bullet \rightarrow O_2 + H_2O$$



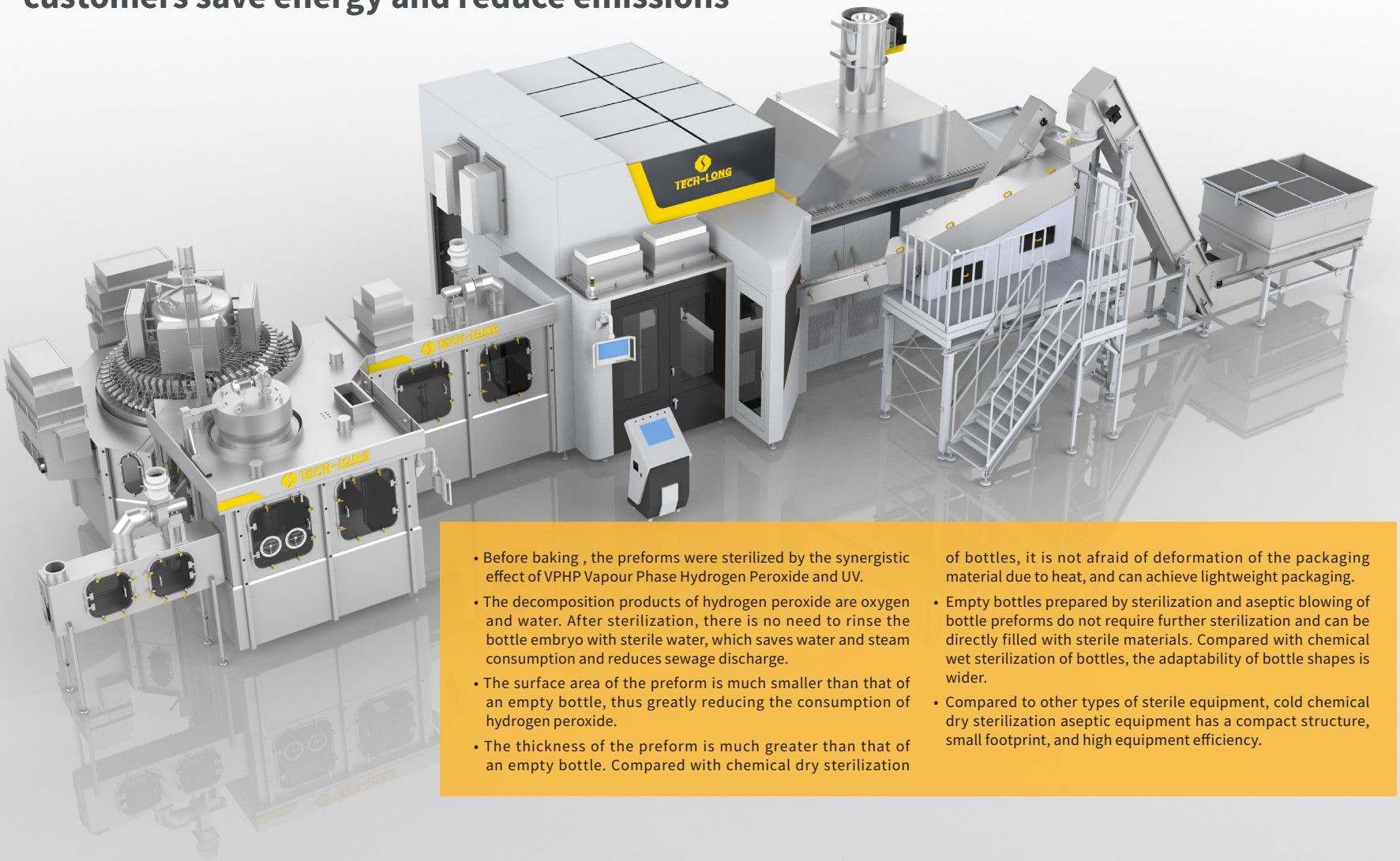
The bactericidal factor is not the H_2O_2 molecule itself.

It is various free radicals generated after decomposition.

Such as OH groups (• OH), reactive oxygen species derivatives, etc.

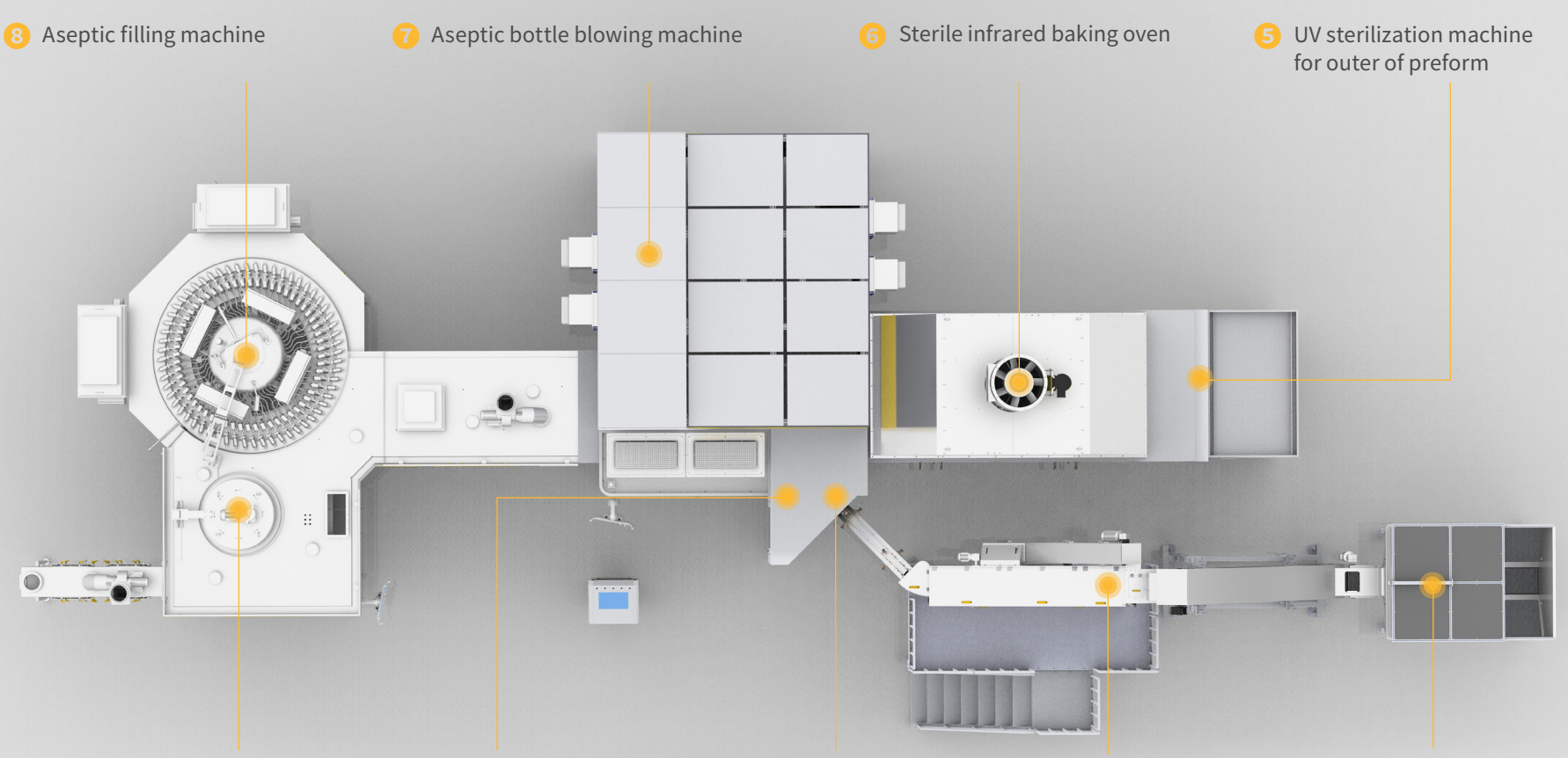
★ The vaporized hydrogen peroxide sterilization process has been applied in the field of paper box sterilization (such as SIG) and PET bottle sterilization (such as Shibuya) for decades.

Tech-Long Preform Chemical Dry Sterilization Aseptic Line started in 2020 to help customers save energy and reduce emissions



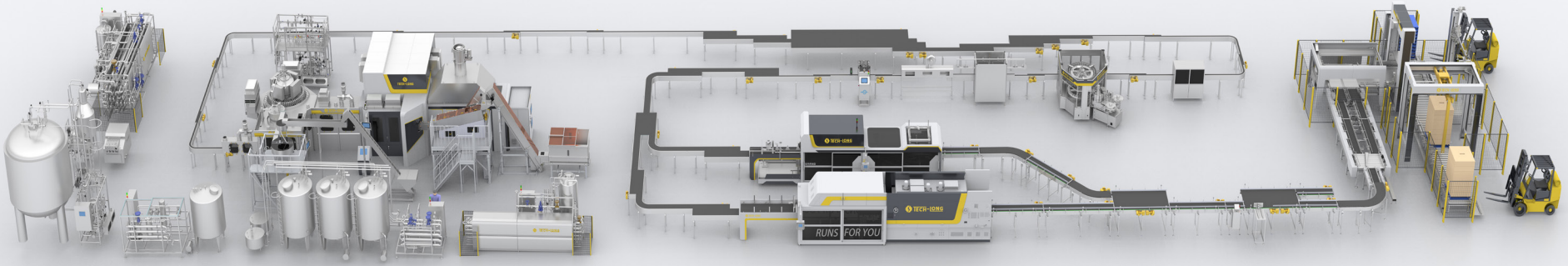
- Before baking , the preforms were sterilized by the synergistic effect of VPHP Vapour Phase Hydrogen Peroxide and UV.
- The decomposition products of hydrogen peroxide are oxygen and water. After sterilization, there is no need to rinse the bottle embryo with sterile water, which saves water and steam consumption and reduces sewage discharge.
- The surface area of the preform is much smaller than that of an empty bottle, thus greatly reducing the consumption of hydrogen peroxide.
- The thickness of the preform is much greater than that of an empty bottle. Compared with chemical dry sterilization of bottles, it is not afraid of deformation of the packaging material due to heat, and can achieve lightweight packaging.
- Empty bottles prepared by sterilization and aseptic blowing of bottle preforms do not require further sterilization and can be directly filled with sterile materials. Compared with chemical wet sterilization of bottles, the adaptability of bottle shapes is wider.
- Compared to other types of sterile equipment, cold chemical dry sterilization aseptic equipment has a compact structure, small footprint, and high equipment efficiency.

Tech-Long Aseptic Blowing-Filling-Capping Combi-Block with Preform Chemical Dry Sterilization Compact structure and efficient operation



Aseptic Blowing-Filling-Capping Combi-Block with Preform Chemical Dry Sterilization Outstanding performance highlights advantages

Since its launch on the market, all projects of the Tech Long Preform Chemical Dry Sterilization Aseptic Line have been **100%** validated by LG culture medium, and have achieved large-scale safe production of neutral (protein) beverages including **soy milk, milk tea, etc.**

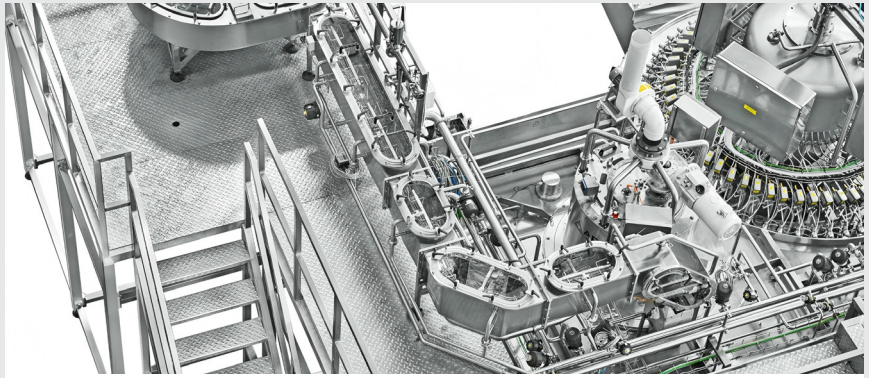


- The UV lamp uses medium voltage ultraviolet to avoid the defects of microbial photoreactivity or dark repair in low-pressure ultraviolet sterilization.
- UV photocatalytic hydrogen peroxide decomposition was used for sterilization, and Bacillus subtilis (ATCC9372) was used as the challenge bacterium for validation. The intra embryonic KLV was ≥ 6 and the extra embryonic KLV was≥5.
- The hydrogen peroxide steam injection nozzle and preform are synchronously moved, and the amount of hydrogen peroxide added is precise and controllable.
- After multiple decompositions, the residual amount of hydrogen peroxide in the product is less than 0.5ppm.
- The consumption of hydrogen peroxide is very low. Taking 500 bottles as an example, the consumption of hydrogen peroxide is only about 0.02g/preform.
- In the operating environment of the bottle blowing machine, the PC-TWA value of hydrogen peroxide is less than 1.5mg/m^3.
- The blow molding section can be equipped with a quick change system for blow molding molds, with a single cavity mold replacement speed of ≤ 1 minute.
- The aseptic filling section can be equipped with bottle free components.
- The aseptic capping section can be equipped with a aseptic mechanical capping machine or a aseptic servo capping machine according to customer needs.
- With nearly 200 aseptic related patents, Tech-Long continues to drive innovative upgrades in aseptic processes and equipment.

Tech-Long diversified bottle cap sterilization technology accurately matches the needs of different customers

Compared to wet sterilization equipment for bottle caps, chemical dry sterilization equipment for bottle caps can save process energy consumption while ensuring sterilization intensity. The installation height of the bottle cap chemical dry sterilization equipment should be higher than that of the bottle cap chemical wet sterilization equipment. Customers can choose bottle cap sterilization equipment that meets their needs based on the source of the bottle cap used, bottle cap structure, bottle cap weight, factory height, energy saving requirements, and investment capability.

Chemical wet sterilization of bottle caps



Safe and reliable

- Adopting spiral soaking method for sterilization, with no dead corners for sterilization.
- Adopting a water spray cap pushing method to reduce mechanical wear of the cap.
- Using sterile water and air staggered spraying to reduce water consumption.
- Spray flushing has mechanical flushing force and can remove debris inside the cap.
- The soaking tank can be used as a cap buffer device to ensure the efficiency of the production line.

Chemical dry sterilization of bottle caps



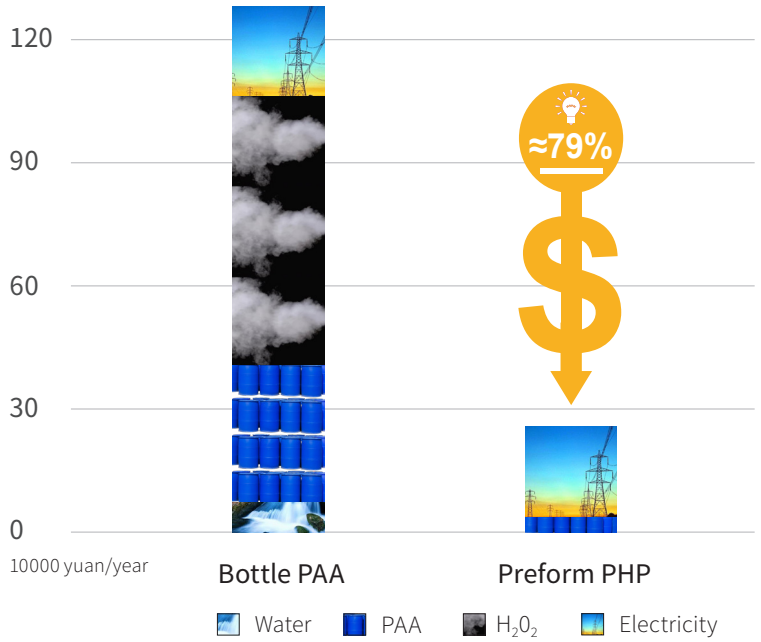
Safe and energy-saving

- Use ion dust removal to remove dust and impurities from the surface of the cap.
- Use a nozzle to add hydrogen peroxide inside and outside the cap.
- Spray sterile hot air to activate hydrogen peroxide.
- The equipment is equipped with a ventilation device to prevent hydrogen peroxide from escaping.
- Equipped with sterile cap buffer to ensure efficiency and reduce cap damage.

The preform/cap chemical dry sterilization technology has outstanding performance in energy saving and meets the needs of industry development

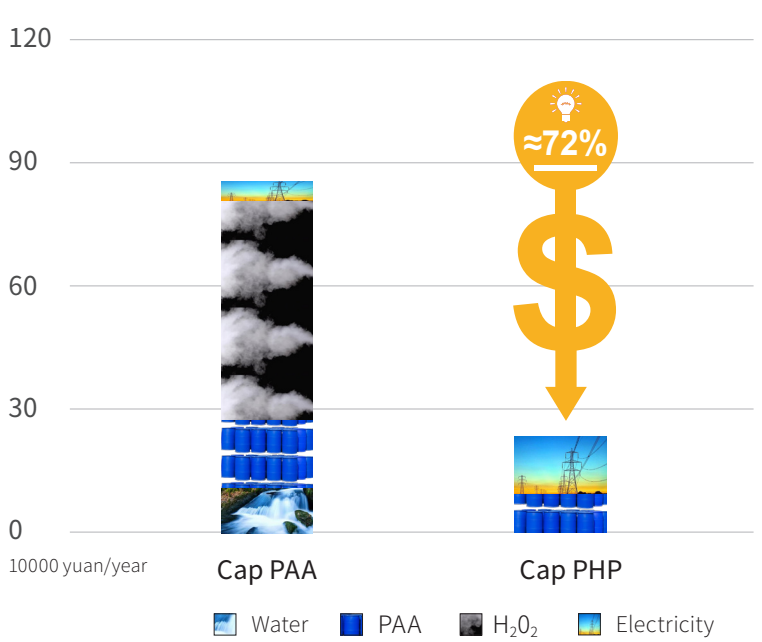
Compared with the traditional chemical wet sterilization process, Tech-Long preform/cap drying sterilization technology does not require the use of steam and water in packaging sterilization, and the cost of disinfectant is significantly reduced, demonstrating outstanding energy-saving performance. This technology not only brings long-term cost advantages to the production and operation of beverage enterprises, but also provides strong support for the transformation of enterprises towards green and sustainable development.

Preform Chemical Dry Sterilization VS Bottle Chemical Wet Sterilization



Note: PET empty bottle processing capacity: 36000BPH Annual operating time: 4400hr

Cap Chemical Dry Sterilization VS Cap Chemical Wet Sterilization



Note: PET empty bottle processing capacity: 36000BPH Annual operating time: 4400hr

Tech-Long meticulously manufactures every sterile fluid machine, strictly adhering to the entire aseptic production process

For sterile lines, numerous sterile fluid machines are extremely important in ensuring product safety and production line efficiency. With over 20 years of experience in designing and manufacturing hundreds of sterile fluid machines, combined with years of accumulated experience in numerous sterile line debugging and tracking services, Tech-Long has been deeply involved in the process design, component selection, installation and manufacturing, program self-control, and other aspects of each sterile fluid machine. At the same time, it optimizes program design in the collaborative work of various machines on the entire line, helping customers achieve dual improvement in product safety and production efficiency on their production lines.



• UHT for preparation of sterile liquid



• UHT for preparation of sterile particles



• Sterile carbonation machine



• UHT for preparation of sterile water

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