

# HIGH QUALITY, HIGH PRODUCTIVITY AND ENVIRONMENTALLY FRIENDLY ASEPTIC FILLING SYSTEM FOR NONGFU SPRING



is a dominant force in packaged water and has maintained the number one position in China in terms of market share since 2012. As for retail sales in 2019, Nongfu Spring ranks among the top three in the Chinese market for tea, functional beverages and juice. There are three reasons for the breakthrough. The first is that they are thoroughly committed to the water source that is the raw material for beverages. This is also the philosophy of Nongfu Spring. Second is the thorough pursuit of product safety and reliability. And finally, it is because of their innovative product development capabilities. This article reviews the path taken by Nongfu Spring and DNP, focusing on the technical aspects of the journey.

DAI NIPPON PRINTING (DNP) HAVE RECEIVED ORDERS FOR MORE THAN 20 ASEPTIC FILLING SYSTEMS FOR PET BOTTLES IN JUST 12 YEARS FROM CHINA'S LARGEST PACKAGING WATER COMPANY, NONGFU SPRING.

WHY? BECAUSE DNP HAS THE LEADING SHARE IN JAPANESE ASEPTIC FILLING SYSTEM MARKET, WHICH HAS EXTREMELY HIGH-QUALITY REQUIREMENTS.

## **NONGFU SPRING: Natural and Healthy Philosophy and Values**

Nongfu Spring was established in 1996 and launched its first packaged water in

1997, sourced from the Thousand-Island Lake in Zhejiang Province. The company

## **DNP Aseptic Technologies: High Productivity and High Sterility**

In 2009, Nongfu Spring considered tea beverages as its next product following packaged water. Nongfu Spring contacted DNP's Shanghai branch in order to produce safe and reliable tea. Subsequently they came to Japan and visited a factory where DNP's aseptic filling system for

PET bottles running at 72,000 bph (bottles per hour) was being used to produce green tea and beverages with milk. As a result, two aseptic filling systems were ordered and installed in

2010 in the Zhejiang Thousand-Island Lake Chayuan Factory. Nongfu Spring's pursuit of quality may have naturally led them to approach DNP, which has the No.1 market share of the aseptic filling

systems in Japan. The aseptic filling system installed at Nongfu Spring was designed not only to have the same aseptic quality as in Japan, but also high productivity.

## DNP combines three patented technologies to achieve overwhelming production volumes.

### 1 The Fastest and Most Reliable Bottle Sterilisation

A 54,000 bph aseptic filling machine needs to sterilise 15 bottles per second. Bottles are transported at a high speed of approximately 1.4 m/sec. To ensure the sterilisation of these fast transporting bottles, high and low concentrations of Vaporised Hydrogen Peroxide (VHP) are atomised in two stages. In addition, the VHP is atomised onto the warm bottles which are still retaining the heat from the blowing process, thus dramatically improving the sterilisation effect. Therefore, it has a high sterilisation effect not only on the bottle interior but also on the bottle exterior (B.atrophaeus : > 6Log reduction under worst-case conditions for sterilisation). This is one of the fastest and most reliable bottle sterilisation method.

### 2 Shorter Downtime: Sterilisation Mode for High-Acid Beverages

Hazardous microorganisms in low-acid beverages are bacterial spores and heat-resistant moulds, whereas high-acid beverages do not contain bacterial spores. This feature enables equipment sterilisation for high-acid beverages (high-acid mode) to start up the filling machine approximately one hour earlier than for low-acid mode. If half of the line, which is changed 200 times a year, is high acid beverages, this leads to an increase in production of more than five million bottles compared to a 54,000 bph filling system without a high-acid mode.

### 3 Flexible UHT Sterilisers

To improve productivity, the system is configured to be able to

feed from multiple UHT sterilisers to multiple aseptic filling machines. By switching the UHT sterilisers aseptically, there is no interruption due to fouling of the UHT steriliser and continuous production is possible. Sterile water for cleaning the aseptic chamber is also supplied from these UHT sterilisers. After production, the UHT steriliser can resume the next production without having to wait for CIP (Cleaning In Place) or SIP (Sterilisation In Place).

**These three technologies dramatically improved productivity and contributed significantly to the reduction of TCO.**

### DNP Aseptic Filling System for Natural Water Suitable for Infants

Nongfu Spring launched a natural drinking water for infants and young children in 2015. The concept is the safest water in the world. Due to relevant regulation and legislation, it needs to be boiled before

infants and young children consume the water. Therefore, Nongfu Spring adopted DNP's aseptic filling system for natural mineral water, which has been used by many major Japanese beverage



companies. This aseptic filling machine is unique in achieving sterile bottles and caps without any chemicals at all.

The water source is natural water from Changbai Mountain in Jilin Province, which is blessed by nature. The beautifully shaped bottle was designed by Nongfu Spring. In addition, this 1-litre bottle was designed so that persons with small hands can hold it with one hand, and that the cap can be easily opened by those with little hand strength. All this was done with the Nongfu Spring's customers in mind.

At the installation, APS conducted microbiological validation of specially shaped bottles blow moulded by KHS and successfully commercialised them.

### What DNP Can Contribute Towards a Sustainable Society

Aseptic packaging can be stored at room temperature, thus reducing GHG emissions compared to chilled distribution. It also contributes to the reduction of food loss due to its long shelf life. On the other hand, food safety is a common issue not only in Japan but also worldwide. Therefore, more reliable and safer aseptic filling systems are required.

DNP have been developing aseptic packaging for 50 years since 1972. We will continue to help solve social issues by leveraging the aseptic technologies, to contribute to the realisation of a sustainable society.

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