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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**General technical requirements for linear aseptic filling capping
machine**

直线式无菌灌装封盖机通用技术要求

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1 Scope

This document defines the terms and definitions of the linear aseptic filling capping machine, specifies the model designation, the types, the basic parameters and working conditions, the technical requirements, the inspection rules and the nameplate, packing, transport and storage, and describes the corresponding test methods.

This document applies to the design, manufacture, inspection and application of linear aseptic filling capping machines, hereinafter called aseptic filling machines, for low-acid liquid products and acid liquid products in the beverage, dairy, pharmaceutical, health product and similar industries.

3 Terms and definitions

3.1 aseptic filling. The process of filling and sealing sterilized liquid product and packaging material in an aseptic environment. [SOURCE: GB/T 41124-2021, 3.2, modified]

3.2 linear aseptic filling capping machine. Equipment that uses dry hydrogen peroxide sterilization and, running in multiple lanes in an intermittent or continuous straight line, carries out aseptic filling and screw capping or lid film heat sealing on plastic bottles of polyethylene terephthalate (PET), polyethylene (PE), polypropylene (PP) and similar materials.

3.3 low acid liquid. A liquid product with an equilibrium pH after sterilization greater than 4.6. [SOURCE: GB/T 19063-2009, 3.8, modified]

3.4 acid liquid. A liquid product with an equilibrium pH after sterilization less than or equal to 4.6. [SOURCE: GB/T 19063-2009, 3.9, modified]

3.5 screw capping. The process of sealing by tightening a cap onto the thread of a plastic bottle.

3.6 lid film hot sealing. The process of sealing a plastic bottle with a lid film by applying heat and pressure.

3.7 cleaning out of place; COP. The cleaning of the surfaces of the equipment inside the aseptic space.

3.8 sterilization out of place; SOP. The sterilization of the surfaces of the equipment inside the aseptic space.

3.9 cleaning in place; CIP. A method in which, without dismantling the equipment or its components and under closed conditions, cleaning solution at a certain temperature and concentration acts forcefully on the surfaces to be cleaned, so that the surfaces in contact

with the product are cleaned. Note: cleaning in place is also called on-site cleaning.

3.10 sterilization in place; SIP. A method in which, without dismantling the equipment or its components and under closed conditions, a sterilizing medium at a certain temperature and concentration, or steam, hot water or superheated water, sterilizes the surfaces in contact with the product so that the intended sterilization requirement is met.

3.11 sterilization efficiency; SE. The logarithm of the ratio of the total number of microorganisms on a given object before and after sterilization. [SOURCE: GB/T 24571-2009, 3.11, modified]

3.12 commercial sterilization. The condition in which the packaged liquid product contains no pathogenic bacteria and no microorganisms capable of multiplying at normal temperature. [SOURCE: GB/T 19063-2009, 3.7]

3.13 aseptic period. The longest interval between the periodic CIP and SIP cleaning and sterilization cycles carried out to keep production in an aseptic state. [SOURCE: GB/T 24571-2009, 3.10]

3.14 product contamination rate. The ratio of the number of bottles in which microorganisms have multiplied to the total number of bottles sampled in one sampling inspection batch of product. [SOURCE: GB/T 24571-2009, 3.14, modified]

3.15 finished product. The product formed after filling and screw capping or lid film heat sealing. [SOURCE: GB/T 33467-2016, 3.6, modified]

3.16 filling accuracy. The quantified indicator of the departure of the net content of filled product in the finished bottle from the standard value. [SOURCE: GB/T 33467-2016, 3.11, modified]

3.17 production capacity. The number of finished products produced per unit of time when the aseptic filling machine is running steadily. [SOURCE: GB/T 38463-2020, 3.16, modified]

3.18 production efficiency. The percentage that the number of finished products produced within the effective time when the aseptic filling machine is running steadily represents of the product of the rated production capacity of the equipment and the effective time. [SOURCE: GB/T 38463-2020, 3.17, modified]

3.19 bottle damaged rate. The percentage that the number of bottles lost when the aseptic filling machine is running steadily represents of the total number of conforming bottles fed in. [SOURCE: GB/T 33467-2016, 3.12, modified]

3.20 cap (film) damaged rate. The percentage that the number of caps or films lost when the aseptic filling machine is running steadily represents of the total number of conforming caps or films fed in. [SOURCE: GB/T 38463-2020, 3.14, modified]

4 Model designation, types, basic parameters and working conditions

4.1 Model designation. The model designation of the aseptic filling machine shall be drawn up in accordance with GB/T 7311. Example: DGWJ40/20N designates a linear aseptic filling capping machine with 40 filling valves and 20 capping heads, of the first design.

4.2.1 The types of aseptic filling machine are: a) by mode of running, intermittent and continuous; b) by mode of bottle feed, single row and multiple row; c) by number of filling operations, single filling and multiple filling; d) by bottle mouth size, one bottle mouth and two bottle mouths; e) by mode of sealing, screw capping and lid film heat sealing.

4.2.2 The basic composition of the aseptic filling machine is: a) bottle sterilizing and drying system; b) cap or film sterilizing and drying system; c) liquid filling system; d) sterile air back pressure system; e) screw capping or lid film heat sealing system; f) cap sorting and feeding system; g) bottle infeed and outfeed system; h) bottle mould plate gripping and conveying system; i) automatic CIP and SIP system; j) hydrogen peroxide vaporizing system; k) automatic COP and SOP system; l) class N5 clean air purification system; m) compressed air sterile system and steam sterile system; n) waste gas collection system.

4.2.3 The following systems may be fitted as options to the aseptic filling machine: a) pulp filling system; b) nitrogen purge system; c) liquid nitrogen dosing system; d) cap changeover system.

4.3 Basic parameters. The names and units of the basic parameters of the aseptic filling machine are: a) rated production capacity, in bottles per hour; b) filling volume, in millilitres, litres or grams; c) number of filling valves; d) number of capping or lid film heat sealing heads; e) rated voltage, in volts; f) frequency, in hertz; g) total power, in kilowatts; h) reference overall dimensions, length by width by height in millimetres; i) reference mass, in kilograms.

4.4.1 The working ambient temperature range shall be 15 degrees Celsius to 35 degrees Celsius, with a fluctuation range of plus or minus 3 degrees Celsius; the relative humidity shall not be greater than 70 % and the altitude shall not be greater than 1 000 m.

4.4.2 The filling room shall at least meet the requirements for a class N8 cleanroom given in 3.0.1 of GB 50073-2013.

4.4.3 The deviation of the supply voltage from the rated voltage shall conform to 4.2 of GB/T 12325-2008.

4.4.4 The water used in production shall conform to GB 5749 and the source pressure shall be greater than 0.3 MPa.

4.4.5 The pressure of the compressed air supply shall be 0.6 MPa to 0.8 MPa; the quality of the compressed air shall conform to GB/T 13277.1-2023, with a particle class not lower