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PEOPLE'S REPUBLIC OF CHINA**

GB/T 46511-2025

General technical requirements for food digital factory

食品数字化工厂通用技术要求

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. This document specifies the technical requirements related to food quality. Food safety requirements can be found in relevant laws, regulations, policies, and food safety standards. document. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Food Quality Control and Management (SAC/TC313). This document was drafted by: China National Institute of Standardization, Foshan Haitian (Gaoming) Seasoning Food Co., Ltd., and Master Kong Beverage Investment. (China) Co., Ltd., COFCO Group Co., Ltd., Inner Mongolia Mengniu Dairy (Group) Co., Ltd., Qianhe Flavoring Food Co., Ltd. Company, Fujian Panpan Food Co., Ltd., Heilongjiang Feihe Dairy Co., Ltd., Mengniu Dairy (Ningxia) Co., Ltd., Luzhou Laojiao Co., Ltd. Siemens (China) Co., Ltd., Beijing Technology and Business University, Sichuan Agricultural University, Beijing

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1 Scope

GB/T 46511-2025 is the Chinese national standard covering the digital food plant - the process and environmental data captured automatically, the batch traceability from ingredient to pallet, the integration of quality and equipment records, and the data integrity required when the record is the evidence of food safety. First edition, under the State Administration for Market Regulation. In force from 1 May 2026. Issued on 5 October 2025, it has been in force since 1 May 2026.

This document specifies the overall requirements, overall architecture, and infrastructure layer, data layer, platform layer, application layer, and management layer of a digital food factory. Requirements such as management level, performance evaluation, and verification methods. This document applies to the design, construction, and operation of digital food factories for food production enterprises.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 23331 Energy Management System Requirements and Usage Guidelines

GB/T 30644 General Requirements for Electronic Records in Food Production and Processing Enterprises

GB/T 41260 Information Security Requirements for Digital Workshops

GB/T 45547 General Technical Specification for Food Production Traceability System

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Digital Factory Based on the processes and equipment required by the production objects, and using information technology, automation, measurement and control technology as means, data connects the factory. Different units are implementation units that plan, manage, diagnose, and optimize the production operation process. [Source: GB/T 37393-2019, 3.3]

3.2 fooddigitalfactory Based on food production processes and equipment, and utilizing information technology, networking, and intelligent technologies, data is used to connect different units within the enterprise. Yuan refers to an advanced manufacturing model that plans, manages, diagnoses, and optimizes the food production process.

3.3 After implementing digitalization, food factories experience benefits such as shorter R&D cycles, increased production efficiency, enhanced quality control, and reduced costs. Sustainable development capability.

3.4 Data visualization The activity of transforming data into visual elements such as graphs, charts, or images.

3.5 food production data Various data generated during the food production process, including information on locations, equipment, personnel, raw materials, production and processing, products, quality management, storage and transportation, etc. Data on the surface.

3.6 digital twin Digitization of a specific target entity with a data connection that ensures synchronization between the physical and virtual states at an appropriate rate and accuracy. Express. [Source: GB/T 43441.1-2023, 3.4]

4. Abbreviations The following abbreviations apply to this document.

5.1 Food quality and safety

5.1.1 Digital food factories should output relevant documents, data, and records required for food quality and safety supervision, and are encouraged to cooperate with regulatory authorities. The data interaction required.

5.1.2 A digital food factory should be able to control key food quality and safety parameters (such as sterilization temperature and foreign object detection) during the production process. Automated monitoring.

5.2 Information Systems

5.2.1 Enterprises should establish information systems. Before using the information systems, they should conduct comprehensive testing and verification of the system's stability and reliability. Ensure the system achieves the expected results.

5.2.2 Enterprises should formulate and verify operating procedures for handling malfunctions or damage to information systems.

5.2.3 Electronic records of information systems shall comply with the provisions of GB/T 30644.

5.3 Data Interconnection

5.3.1 A digital food factory should establish standardized documents for data exchange between various stages of food production.

5.3.2 A digital food factory should enable data interaction between all stages of food production.

5.3.3 Digital food factories should enable data interaction with upstream and downstream enterprises in the supply chain.

5.4 Information Security Information security in digital food factories should comply with the provisions of GB/T 41260.

5.5 Personnel Requirements

5.5.1 Senior management personnel of enterprises should attach importance to the construction of digital factories and understand the relevant professional knowledge.

5.5.2 Personnel involved in digital food factories should possess digital-related knowledge and skills and receive regular training.