

## Translation for reference

Annex 1

# **Technical Guidelines for Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation**

(2nd Edition)

## **1. Basis and Scope of Application**

In order to standardize and guide the cold-chain food related units and employees which operate normally during the regular epidemic prevention and control of COVID-19 to implement the main responsibility of epidemic prevention and control in production and operation, with reference to the *Guidelines for Prevention and Control of COVID-19 in Meat Processing Enterprises* issued by the Joint Prevention and Control Mechanism of the State Council in Response to COVID-19 (Joint Prevention and Control Mechanism ZF [2020] No. 216), *Technical Guidelines for Prevention and Control of COVID-19 in Farmers' (Pedlars') Markets* (Joint Prevention and Control Mechanism ZF [2020] No. 223), *Solutions for Prevention and Control of COVID-19* (8th Edition) (Joint Prevention and Control Mechanism ZF [2021] No. 51), *Notice of the Joint Prevention and Control Mechanism of the State Council in Response to COVID-19 on Strengthening the Prevention and Control of COVID-19 in Port Cities* (GBFMD [2021] No. 14), and relevant national food safety standards and the *Guidance on Preventing the Spread of COVID-19 in Food Production and Management* issued by the Food and Agriculture Organization of the United Nations (August 2021) and other documents, the Guidelines are hereby formulated for cold-chain food producers and operators and key links in production and operation.

The Guidelines apply to the prevention and control of SARS-CoV-2 contamination in various links of production, loading and unloading, transportation, storage and sales of cold-chain food, which is always in low temperature from factory to sale, processed by freezing, refrigerating, etc., and can be referred to by the operating units and relevant employees of premises storing imported cold-chain food in the port area.

The Guidelines focus on preventing cold-chain food employees and related personnel from being infected by SARS-CoV-2, highlight the COVID-19 prevention and control of personnel at high-risk positions such as porters and unpacking workers engaged in key links such as loading, unloading, storage and transportation in key places such as centralized supervision warehouses or cold storage at the first station, and emphasize strengthening the cleaning and disinfection of cold-chain food packaging. It is a prerequisite for the application of the Guideline that producers and operators strictly comply with laws and regulations and the requirements of relevant national food safety standards, and implement the regulations of local competent authorities on the prevention and control of COVID-19.

## **2. Health Management on Prevention and Control of SARS-CoV-2 for Employees**

The health of employees is fundamental to prevent cold-chain foods from being contaminated by SARS-CoV-2. Producers and operators involved in the production, loading and unloading, transportation, storage, sales and catering services of cold-chain foods shall adjust and update the health management system of employees in time, improve the management measures for the prevention and control of SARS-CoV-2, and strictly protect employees from infection in accordance with the requirements on prevention and control of COVID-19.

### **2.1 Establishment of Health Registration System for Employees on duty**

Cold-chain food producers and operators shall register the travel and health status of employees (including new and temporary employees) in the past 14 days, establish a health

card for employees on duty, require new employees to provide a certificate of vaccination with COVID-19, a certificate of nucleic acid negative report within 48 hours and a normal health code and travel code, and master the mobility and health status of employees.

## **2.2 Daily Health Monitoring of Employees**

Cold-chain food producers and operators shall strengthen personnel access management and health monitoring, establish a standing book for all staff health status (including 10 major symptoms: fever, dry cough, fatigue, loss of smell and taste, nasal obstruction, runny nose, sore throat, conjunctivitis, myalgia, diarrhea) and risk exposure information reporting system, set up temperature measurement points at the entrance of food production and operation area, implement prevention and control measures such as registration, temperature measurement, disinfection, health code check, and implement the "Health QR Code" engaging system.

## **2.3 Nucleic Acid Testing for Employees**

Nucleic acid testing is an important means of early detection of infected individuals, thus cold-chain food employees shall accept relevant testing in accordance with the *Solutions for Prevention and Control of COVID-19 (8th Edition)* (Joint Prevention and Control Mechanism ZF [2021] No. 51). The frequency of nucleic acid testing shall be appropriately increased for personnel at high-risk positions in key places and key links.

Personnel at high-risk positions include, but are not limited to the following personnel: Personnel at high-risk positions who are in direct contact with imported cold-chain food without preventive disinfection for the first time, such as porters, handling workers, unpacking workers, disinfection workers, forklift operators, warehouse keepers, sampling personnel and garbage cleaning personnel in the centralized supervision warehouse or the cold storage at the first station; defrosting front-end personnel of imported cold-chain food production and processing enterprises, such as porters and unpackers.

Personnel in high-risk positions shall accept high-frequency nucleic acid testing, and the specific frequency can be adjusted appropriately based on risk study and judgment in accordance with local conditions. In principle, reasonable arrangements shall be made to ensure that personnel in the same category accept nucleic acid testing every day.

## **2.4 Registration and Management of External Personnel**

The entry of outsiders into the production and operation area should be minimized as far as possible. If necessary, they need to register their employer, health status, exposure to people in the epidemic area, etc. They may be allowed to enter after taking measures such as the check of health code and travel code, registration, temperature measurement, and personal protection (such as wearing masks). When the vehicle enters or leaves, the person inside the vehicle shall not get off. If they really need to get off, such measures above shall be taken for them. The guards on duty, staff and drivers shall avoid unnecessary contact.

## **2.5 Hygiene Requirements for Employees**

2.5.1 Health on duty. Ensure good health condition before starting work, report the health status information to the corresponding producers and operators, and take the initiative to accept the body temperature measurement by such producers and operators. In case of fever, dry cough, fatigue and other symptoms, take the initiative to report immediately and seek medical treatment in time.

2.5.2 Do personal protection. Employees shall wear masks, gloves and work clothes correctly during their work. The work clothes shall be kept clean and tidy, cleaned regularly and disinfected when necessary. In addition to work clothes, employees in special positions (fresh meat slaughtering, meat-splitting workshop, etc.) shall wear waterproof aprons and rubber gloves according to the protection requirements. It is recommended that food

employees wear disposable gloves, but they must change such gloves frequently, and wash their hands in the interval of changing those gloves and when they are not wearing gloves. To avoid secondary contamination of protective equipment, gloves must be changed after non-food related activities (such as opening/closing doors and emptying garbage bins by hand).

2.5.3 Pay attention to personal hygiene. Cover the nose and mouth with tissues or elbow arms when sneezing or coughing. Do not spit everywhere and pay attention to hygiene when blowing the nose. Try to avoid touching the mouth, eyes and nose with hands.

2.3.4 Strengthen hand hygiene. When handling goods or touching public objects such as shelves and handrails with hands, people are required to wash hands with hand sanitizer or soap under flowing water in time, or rub hands with quick-drying hand disinfectant.

## **2.6 Establishment of Health Exception Reporting Procedure**

Once an employee finds that he/she or a person living together has fever, dry cough, fatigue and other suspected symptoms, he/she shall report to the top management personnel of the production and operation in a timely manner, either by reporting level by level or direct reporting as appropriate. Once the producers and operators find that an employee has the above-mentioned abnormal health symptoms, regardless of the health condition he/she presents, they shall take effective measures to promptly exclude him/her and the employees in close contact with him/her from the food working environment. In areas with high transmission risk of COVID-19, it is recommended to make "Zero" report for healthy employees according to the prevention and control regulations of local competent authorities.

## **2.7 Procedure for Returning to Work of Employees**

According to the registration and health records of on-the-job employees in the production and operation areas, timely track the treatment and rehabilitation status of employees with abnormal health, physical discomfort, suspected or infected with SARS-CoV-2 (patients or asymptomatic virus-infected persons), and scientifically evaluate whether they meet the conditions for returning to work after their rehabilitation. The quarantine can be released if symptoms of COVID-19 confirmed cases are resolved and two PCR nucleic acid tests are negative at intervals of at least 24 hours. Employees who are close contacts of COVID-19 patients shall also meet the above control requirements before returning to work.

## **2.8 Strengthening of Publicity of Prevention and Control Knowledge**

Producers and operators shall carry out various forms of health education, guide employees to master the knowledge and skills related to the prevention and treatment of COVID-19 and other respiratory infectious diseases, develop good hygiene habits, and strengthen self-protection awareness.

# **3. Requirements for Prevention and Control of SARS-CoV-2 during Loading, Unloading, Storage and Transportation**

## **3.1 Hygiene Requirements for Handling Workers and Other Workers**

For personnel at high-risk positions who are in first direct contact with imported cold-chain food without preventive disinfection, such as porters, handling workers, unpacking workers, disinfection workers in the centralized supervision warehouse or the cold storage at the first station, the workers shall be fixed with closed-loop management, and the nucleic acid testing shall be carried out for them with reference to 2.3.

In addition to fulfilling the general personal hygiene requirements, handling workers shall wear special work clothes and caps, disposable medical masks, gloves, etc. before handling the goods, and if necessary, wear goggles and face shields to avoid frequent contact of the goods surface with the personnel's body surface.

In particular, when loading and unloading imported cold-chain foods from epidemic areas, relevant personnel shall wear masks in a standard manner y in the whole process of handling goods, avoid the goods close to the face, avoid touching the mouth and nose with hands, and prevent direct contact with frozen aquatic products that may be contaminated by SARS-CoV-2. If the mask is damaged during handling, it shall be replaced immediately.

### **3.2 Hygiene Requirements for Transportation Drivers**

In addition to protecting themselves according to the hygiene requirements for employees, the personnel transporting imported cold-chain foods (drivers, etc.) are not allowed to unpack or open the packages of cold-chain foods and directly contact with cold-chain foods without authorization during transportation. When the vehicle enters or leaves, the driver and accompanying personnel shall avoid unnecessary contact with the guard on duty and staff.

### **3.3 Hygiene Management at the Source of Goods**

For imported cold-chain foods, importers or cargo owners shall cooperate with relevant departments to sample and test the foods and their packages. For out-of-town foods, distributors shall take the initiative to ask suppliers for relevant food safety and epidemic prevention testing information. If the importers or cargo owners entrust a third-party logistics company to provide transportation, warehousing and other services, when the goods are delivered to the third-party logistics company, they shall take the initiative to provide the relevant food safety and testing information required for epidemic prevention to the third-party logistics company.

In the process of cold-chain logistics, if supports or liners need to be installed in the logistics packages, they shall meet the relevant food safety and hygiene requirements. The temperature conditions of cold-chain food storage and transportation shall be indicated on the logistics packages. Strengthen the management of operations such as loading and unloading and handling of goods, do not make the goods directly contact the ground, and do not open the cold-chain food packages at will. It shall be ensured that the temperature of cold-chain foods is always within the allowable fluctuation range during transportation, storage and sorting. Record and keep the time, temperature and other information of each delivery and receiving link.

### **3.4 Hygiene Management of Vehicles**

It shall be ensured that the interior of the vehicle compartment is clean, non-toxic, harmless, odor-free and pollution-free, and preventive disinfection shall be carried out regularly. For specific disinfection measures, please refer to *Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation (2nd Edition)*.

### **3.5 Hygiene Management of Storage Facilities**

To strengthen the warehousing inspection, in addition to checking the appearance and quantity of cold-chain foods, the central temperature of cold-chain foods shall also be checked. To strengthen the storage management in the warehouse, the cold-chain food stacking shall be placed on the pallets or shelves according to relevant regulations. Cold-chain foods shall be stacked in different warehouses or locations according to the characteristics, and cold-chain foods with large differences in temperature and humidity requirements and easy cross-contamination shall not be mixed. The temperature and humidity in the warehouse shall be detected regularly, and the temperature and humidity in the warehouse shall meet the storage requirements of cold-chain foods and shall be kept stable. The internal environment, shelves and operation tools, etc. of the warehouse shall be cleaned and disinfected regularly. For specific cleaning and disinfection measures, please refer to *Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and*

*Operation (2nd Edition).*

## **4. Requirements for Prevention and Control of SARS-CoV-2 in Production and Processing**

### **4.1 Personnel Hygienic Requirements**

Follow the requirements of Article 2.5.

For the unfreezing front-end personnel of imported cold-chain food production and processing enterprises, such as handling workers, unpackers and other personnel at high-risk positions, the workers shall be fixed with closed-loop management, and the nucleic acid testing shall be carried out for them with reference to 2.3.

### **4.2 Social Distancing**

Employees should keep a distance of at least 1 meter apart from each other. The feasible measures to maintain social distance in the food processing environment are as follows: preventing employees from face-to-face contact by setting workbenches only on one side of the production line, staggering working positions or assembling baffles between production lines; limiting the number of employees in food preparation areas, and excluding all nonessential personnel; dividing employees into working groups or teams, and reducing communications and mutual influence between working groups.

### **4.3 Protection and Inspection in Purchasing Goods**

4.3.1 Protection in handling. Handling workers who will be in direct contact with cold-chain food goods shall wear work clothes and caps, disposable medical masks, gloves, etc. before handling the goods, and if necessary, wear goggles and face shields to avoid frequent contact of the goods surface with the personnel's body surface.

4.3.2 Source control. Cold-chain food enterprises shall carry out compliance inspection and evaluation on suppliers, conscientiously verify and inspect each batch of incoming food, faithfully record and save the information of food and raw material incoming inspection, delivery inspection, food sales and other information to ensure the traceability of food. The records and certificates shall be saved until 6 months to the least after the expiration of the shelf life of such products and shall be saved for a period of no less than 2 years for products with no specified shelf life.

4.3.3 Inspection certificate. For imported cold-chain foods, importers or cargo owners shall cooperate with relevant departments to sample and test the foods and their packages. For out-of-town foods, distributors shall take the initiative to ask suppliers for relevant food safety and epidemic prevention testing information.

### **4.4 Cleaning and Disinfection**

Refer to the *Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation (2nd Edition)*.

### **4.5 Other Protective Measures**

4.5.1 Ventilation requirements. Natural ventilation is preferred for ordinary workshops, and forced ventilation can be supplemented if conditions do not allow so. For enclosed workshops, it is required to keep indoor air circulation and maintain the air supply safety of the air conditioning system. The air-conditioning ventilation system shall be inspected, cleaned and disinfected regularly to ensure clean and safe operation.

4.5.2 Water supply and drainage facilities. Well-developed sewers shall be set and maintained unblocked. Ground flushing faucets and disinfection facilities shall be provided for flushing and disinfection of sewage. Sewage discharge shall comply with relevant regulations.

## **5. Requirements for Prevention and Control of SARS-CoV-2 in Sales Operation**

Cold-chain food centralized trading markets (wholesale markets of agricultural products, farmer's markets, community vegetable markets), supermarkets, convenience stores, restaurants, self-operated e-commerce and other food operators shall have appropriate refrigeration facilities.

### **5.1 Personnel Hygienic Requirements**

The requirements of Article 2.5 should be followed. In addition to work clothes, food operators in special stalls involving sales of fresh meat and slaughter process shall wear waterproof aprons and rubber gloves.

### **5.2 Social Distancing**

The number of customers entering the cold-chain food sales area shall be controlled within a reasonable scope to avoid gathering and crowding. The distance between people shall be at least 1 meter, which shall be moderately increased for confined spaces. Ground marks can be used to guide and manage customers' orderly queuing, so as to facilitate customers' social distancing, especially in crowded areas, such as service counters and checkout counters.

### **5.3 Cleaning and Disinfection**

Refer to the *Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation (2nd Edition)*.

### **5.4 Warning Notification**

5.4.1 Signs shall be set at the entrance to require customers not to enter the store if they are in any abnormal health conditions, suffer any physical discomfort or any suspected symptoms of COVID-19.

5.4.2 Notifications shall be regularly broadcast or posted in retail areas of cold-chain food (shops, stores and supermarkets) to remind customers to keep social distance and clean their hands in time. If consumers bring their own shopping bags, it is suggested that such bags packing cold-chain food can only be re-used after being cleaned.

### **5.5 Other Protective Measures**

Glass shields shall be set at checkout counters and front desks, and contactless payment shall be encouraged to reduce contact among people. It should be considered not to publicly display or sell unpacked cold-chain food at the self-service counter.

## **6. Requirements for Prevention and Control of SARS-CoV-2 in Catering Processing**

In order to prevent and control SARS-CoV-2 contamination in catering service links involving cold-chain food, catering service providers shall pay attention to the following key points for prevention and control.

### **6.1 Personnel Hygienic Requirements**

Follow the requirements of Article 2.5.

### **6.2 Social Distancing**

6.2.1 Appropriate measures shall be taken to prevent people from being too crowded, and a distance of at least 1 meter shall be maintained between employees in the food industry.

6.2.2 Dining seats shall be arranged at a safe social distance.

6.2.3 Ground marks can be used in restaurants to facilitate customers' social distancing, especially in crowded areas, such as service counters and checkout counters.

### **6.3 Cleaning and Disinfection**

Refer to the *Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation (2nd Edition)*.

#### **6.4 Other Protective Measures**

6.4.1 Providing cleaning disinfectant. Hand sanitizer or disinfectant shall be provided for employees and consumers entering the dining area.

6.4.2 Preventing cross contamination. Raw food and cooked food shall be processed and stored separately, and the instruments and tools for handling uncooked food shall be fully disinfected before being used to hold or process cooked food.

6.4.3 Avoiding unnecessary physical contact. Mobile contactless payment and contactless delivery shall be encouraged.

6.4.4 Keeping air circulation. Indoor ventilation shall be maintained by opening windows frequently.

6.4.5 Providing cooked food whenever possible. During the epidemic, food shall be fully heated.

6.4.6 Individually served meals shall be advocated in catering services. When it is not practical to do so, serving spoons and chopsticks shall be provided.

#### **7. Emergency Measures in Relevant Areas**

Cold-chain food producers and operators shall formulate COVID-19 emergency solutions for timely disposal and report of epidemic situations and effective prevention of SARS-CoV-2 from spreading.

##### **7.1 Emergency Disposal When Any Person Being in Abnormal Health Conditions**

Once a case or any person in suspected abnormal conditions of COVID-19 is found in relevant areas of cold-chain food production and operation, it is required to implement the prevention and control measures against internal proliferation and output cases, cooperate with relevant departments to carry out epidemiological investigations, follow-up management of close contacts, disinfection of epidemic spots, etc., and carry out sampling and nucleic acid tests on the workplace where such case or suspected case works and the cold-chain food processed. If there is an air-conditioning ventilation system, it shall be cleaned and disinfected at the same time and can be re-started only after passing the evaluation. According to the severity of the epidemic, the workplace shall be temporarily closed and the production can be resumed only after the epidemic is under control.

In accordance with the requirements of prevention and control of COVID-19, measures such as cutting off transmission routes and quarantining close contacts shall be taken, and contaminants shall be disposed of according to relevant regulations.

##### **7.2 Emergency Disposal When Samples Tested Positive by Nucleic Acid Test**

Once notified of the samples tested positive for SARS-CoV-2 by nucleic acid test, the cold-chain food producers and operators shall quickly start the emergency plan of their own units, and take emergency disposals of related goods and the environment in time according to local requirements under the guidance of professionals. Related goods shall be temporarily sealed up for sampling and harmless disposal, working areas shall be disinfected, and nucleic acid tests, health screening and other measures shall be taken for possible contacts. Before the disposal of these items, the refrigerator, freezer, refrigeration storage and other refrigeration equipment shall be kept in normal operation to prevent such items from spoiling and possible spread of contaminants. Spilling or leakage shall be avoided during the transportation of relevant items for disposal. Personnel involved in the removal of relevant items should strictly take personal protection measures.

For the cold-chain food tested positive for SARS-CoV-2 by nucleic acid test, the relevant requirements for classification and disposal of cold-chain food for prevention and control of COVID-19 shall be followed.



# **Technical Guidelines for Disinfection in Prevention and Control of SARS-CoV-2 in Cold-chain Food Production and Operation**

(2nd Edition)

## **1. Basis and Scope of Application**

In order to standardize and guide the disinfection work in prevention and control of SARS-CoV-2 in cold-chain food production and operation and prevent food packaging materials from being contaminated by SARS-CoV-2, in reference to the *Guidelines for Prevention and Control of COVID-19 in Meat Processing Enterprises* issued by the Joint Prevention and Control Mechanism of the State Council in Response to COVID-19 (Joint Prevention and Control Mechanism ZF [2020] No. 216), *Urgent Notice on Strengthening the Works including Nucleic Acid Test on Cold-chain Food for SARS-CoV-2* (Joint Prevention and Control Mechanism ZF [2020] No. 220), *Technical Guidelines for Prevention and Control of COVID-19 in Farmers' (Pedlars') Markets* (Joint Prevention and Control Mechanism ZF [2020] No. 223), *Solutions for Prevention and Control of COVID-19* (8th Edition) (Joint Prevention and Control Mechanism ZF [2021] No. 51) as well as relevant national food safety standards and documents such as the *Guidance for Preventing the Spread of COVID-19 in Food Businesses* issued by the Food and Agriculture Organization of the United Nations (August 2021), the Guidelines are formulated.

The Guidelines are applicable to cold-chain foods that are processed by freezing or refrigeration and whose products are always in a low-temperature state from delivery to sale. The Guidelines can be adopted to guide the food production and operation entities and individuals under normal operation to disinfect cold-chain foods from high-risk areas of COVID-19 at home and abroad in the loading and unloading, transportation, storage, production, sales and other processes during the regular epidemic prevention and control of COVID-19. The Guidelines can be referred to by the operating units and relevant employees of premises storing imported cold-chain food in the port area.

It is a prerequisite for the application of the Guidelines that food production and operation entities and individuals strictly abide by the requirements of laws and regulations and relevant national food safety standards, and implement the provisions of the local competent authorities on the prevention and control of COVID-19.

## **2. Cleaning and Disinfection in Production and Processing**

Effective cleaning and disinfection regulations targeting processing personnel, production environment and related equipment and facilities in cold-chain food production and processing shall be formulated according to the characteristics of food raw materials and products and the technologies of production and processing, and the implementation and effect of disinfection measures shall be assessed on a regular basis.

### **2.1 Food Production and Processing Personnel**

Food production and processing personnel entering the operating area, on the premise of confirming that they are in good health and have taken personal protection measures satisfying relevant requirements, shall focus on hand hygiene, disinfect their hands with quick-drying hand disinfectant, and rub their hands with an appropriate amount of hand disinfectant until the hands are dry. Keep away from fire sources when using.

### **2.2 Outer Packaging of Raw Materials and Semi-finished Products**

2.2.1 For cold-chain food raw materials and semi-finished products from high-risk

regions (countries) of COVID-19, strict and effective disinfection shall be carried out on their outer packaging before they are admitted to any enterprises or warehouses. Departmental coordination shall be strengthened. In principle, the loading tools, transportation tools and packages of imported cold-chain food shall only be disinfected once to avoid repeated disinfection.

2.2.2 Tools and instruments used for handling raw materials or semi-finished products of cold-chain food (such as transit boxes, spoons, and pliers) shall be cleaned and disinfected in time after each use.

2.2.3 Food raw materials or/and semi-finished products from foreign epidemic areas that have been detected to be contaminated by SARS-CoV-2 shall be handled in accordance with the relevant requirements for classification and disposal of cold-chain food for prevention and control of COVID-19.

### **2.3 Production and Processing Equipment and Environment**

2.3.1 Equipment and appliances. Appliances used before and after production and processing shall be placed in separate places and kept properly to avoid cross-contamination. All equipment and instruments after production and processing (or when it is necessary during production and processing) shall be effectively cleaned and disinfected, and the selected cleaning and disinfection procedures and disinfectants shall be ensured to be capable of effective killing of SARS-CoV-2.

2.3.2 Environment. The high-risk areas such as the workshops in each link of raw materials processing of cold-chain food, the workshops in each link of ready-to-eat and cooked food production, and the refrigerated storage shall be disinfected at an increased frequency. The environment during and after production and processing should be thoroughly cleaned and disinfected, in particular, the worktops, contact surfaces/points (such as door handles, switches, appliance handles, telephones, and toilets) and crowded areas that people come into contact with during the production and processing.

2.3.3 As all kinds of meat, aquatic products, egg products and other food rich in protein and fat are prone to form dirt that is not easy to remove from the surface of its contact objects, and their production and processing environment is usually at low temperature and in high humidity, with the aim to improve the disinfection effect, minimize the amount of disinfectant used and shorten the contact time between the disinfectant and the surface, all the containers, equipment or environmental surfaces in contact with meat, aquatic products, egg products and other food rich in protein and fat must be thoroughly cleaned before disinfection.

#### **2.3.3.1 Selection of detergent**

Commonly-used detergents for food processing equipment and environment include alkaline solutions, saline solutions (e.g., phosphate, carbonate, silicate), acid (e.g., citric acid, phosphoric acid) solutions, and synthetic detergents (e.g., anionic detergent, cationic detergent and nonionic alkaline detergents). Alkaline solution is the most commonly used cleaning solution for the processing environments of meat, aquatic products and egg products, and 1.5% sodium hydroxide solution may be used as a detergent, which can saponify fats and hydrolyze protein deposits. In addition, various synthetic detergents may also effectively remove meat deposits, fat and dirt, and should be used at a proper temperature and in contact with the surface to be cleaned for a certain period of time before rinsing with water. Another way to saponify fats for easy cleaning is to prepare a protease solution from proteolytic enzymes that can break down proteins with alkaline solution of low concentration. Since the enzyme will be deactivated at high pH and high temperature, the temperature and pH value of the prepared enzyme solution should be proper so that the corrosion on the surface to be cleaned can be greatly reduced.

### 2.3.3.2 Cleaning process

- (1) In order to save detergent and water, physical methods should be first used to remove the dirt on the surface.
- (2) The dirt should be further rinsed with water, but high pressure water is used for rinsing as less as possible to reduce the generation of aerosol.
- (3) Alkaline solution or synthetic detergent/enzyme solution at 50-55°C is applied to the surface to be cleaned, and then the surface to be cleaned is cleaned and wiped after 6-12 minutes of contact. In order to make the detergent fully contact with the surface to be cleaned, it is best to use foaming detergent to clean the vertical surface.
- (4) Rinse off alkaline solution or detergent with clean water.
- (5) The alkaline solution cannot remove scale or rust, so acids (such as phosphoric acid, hydrochloric acid, or organic acid like citric acid and gluconic acid) can be used to remove scale or rust.

### 2.3.3.3 Disinfection

- (1) In order to improve the disinfection effect and prevent the activity of disinfectant from being reduced as a result of insufficient contact with the surface of an object, all equipment or environmental surfaces to be disinfected must be thoroughly cleaned according to the above procedures before disinfection. Commonly used disinfectants include disinfectants containing chlorine and iodine or quaternary ammonium salt solutions.
- (2) Whether the surface disinfected needs to be rinsed or not depends on the disinfectant used. Both quaternary ammonium salt disinfectants and iodine-containing disinfectants shall be thoroughly rinsed off with water after use.
- (3) If the surface of the equipment is corroded after disinfection, the corroded part can be protected by applying oil. The food-grade oil is not required to be removed after use; while non-food-grade oil must be removed before the start of the next processing procedure.
- (4) Moving conveyor belts and other components of production and processing equipment should be continuously cleaned by clean in place method.

## **3. Cleaning and Disinfection during Transportation and Distribution**

### **3.1 Personnel**

In the process of cold-chain food distribution, drivers and accompanying personnel should maintain personal hand sanitary, and the vehicles should be provided with alcohol-based hand sanitizers, disinfectants and paper towels to ensure that hands are regularly disinfected without clean water.

### **3.2 Object Surface**

Drivers should wash or disinfect their hands before delivering and handing over the shipping documents to corporate employees. To avoid cleaning the returns, the documents should be placed in disposable containers and packaging materials. Reusable containers should be cleaned and disinfected regularly and appropriately.

Surfaces that are most likely to be contaminated by viruses, such as steering wheels, door handles and mobile devices that are frequently touched by people, should be disinfected regularly.

It is strictly prohibited to unpack the goods or transfer them to others during the transportation of cold-chain food. If it is necessary to unpack or transfer the goods, they shall be disinfected in accordance with 2.2.

### **3.3 Means of Transportation**

To prevent the cold-chain food from being contaminated, drivers should ensure that the transport vehicles, handling tools and containers are clean and regularly disinfected. When various goods are loaded on a vehicle, food shall be separated as much as possible from other goods. Before and after a vehicle transports a batch of goods, the parts of the vehicle that may be touched by people should be thoroughly disinfected, especially inside and outside the carriage.

### **4. Cleaning and Disinfection during Sales and Operation**

4.1 Employees working in sales and operation areas of cold-chain food should operate hygienically and wash hands frequently with hand sanitizer to keep personal hands clean and sanitary.

4.2 All object surfaces, handles (e.g. door handles, refrigerator handles, container handles, cart handles) and buttons (e.g. calculator, electronic scale) that are frequently touched by people should be promptly cleaned and disinfected. The operation areas should be completely disinfected after the operation every day.

4.3 Provision of convenience to customers for hand washing and disinfection. It should be ensured that handwashing facilities in the store function properly and quick-drying hand disinfectants are provided. If possible, an induction hand disinfection machine may be provided.

### **5. Cleaning and Disinfection during Catering**

5.1 All contact surfaces, outer packages and tools of cold-chain food should be regularly cleaned and disinfected in catering services, and the dishes and condiment containers should be cleaned and disinfected more frequently.

5.2 The object surfaces that are frequently touched should be well disinfected, and more frequent cleaning and disinfection should be performed for all kinds of equipment, areas, contact surfaces/high-frequency contact points (such as worktops/clips/service tools/open self-service display stands/door handles), garbage cans, and sanitary wares. In addition, employees' work clothes should be cleaned and disinfected more frequently.

5.3 It should be ensured that handwashing facilities in the store function properly and quick-drying hand disinfectants are provided. If possible, an induction hand disinfection machine may be provided.

### **6. Disinfection Methods Commonly Used in Production and Operation**

Chemical and physical disinfection technologies can be selected for disinfection in the production, transportation, sales and other production and operation processes of cold-chain food.

#### **6.1 Physical Disinfection**

Physical disinfection methods that have been proven effective by laboratory and on site and evaluated and qualified by relevant agencies can be used to disinfect all links of cold-chain food production and operation.

#### **6.2 Chemical Disinfection**

Common disinfectants and use methods are shown in the attached table.

#### **6.3 Quality Control of Disinfection**

Cold-chain food producers and operators shall be equipped with professional disinfection personnel and special equipment to disinfect cold-chain food, production equipment, environment, etc., and the disinfection personnel shall be systematically trained and qualified

before taking up their posts; Disinfection equipment shall be regularly overhauled and maintained; Chemical disinfectant selection, proportioning methods, disinfection concentration, ambient temperature conditions, action time, operation methods, precautions and disinfection effect evaluation shall be strictly subject to the Schedule or Annex.

6.4 No matter chemical or physical technology is used for disinfection, it is important to ensure that each side of the food packaging material is thoroughly disinfected. To avoid the unevenness of artificial disinfection, it is recommended to give priority to automatic disinfection equipment.

- Appendixes:
1. Low-temperature Disinfectants Commonly Used in Cold-Chain Food Production and Operation and Their Application Methods
  2. Principles of Evaluation and Guidance for Low-temperature Disinfection on Cold-chain Food Outer Packaging Site

## Appendix 1

### Low-temperature Disinfectants Commonly Used in Cold-Chain Food Production and Operation and Their Application Methods

Disinfectant Type	Main Active Ingredients and Dosage Forms	Method of Application	Precautions
Chlorine-containing low-temperature disinfectant	Sodium dichloroisocyanurate Binary packaging, powder and liquid	1. Disinfection methods: spraying disinfection, soaking disinfection, wiping disinfection. 2. Disinfectant action dose: For -18°C low-temperature disinfectant, action concentration is 3000mg/L, the action time is 10-20min, and spraying about 200ml/m <sup>2</sup> . For -40°C low-temperature disinfectant, action concentration is 5000mg/L, action time is 10-20min, spraying about 200ml/m <sup>2</sup> .	1. Low-temperature disinfectants used on site must be legal and effective. Before the disinfectants go to the market, the health and safety evaluation of disinfection products shall be completed and put on record according to the <i>Notice of the General Office of the National Health Commission on Printing and Issuing Technical Requirements for Health and Safety Evaluation of Low-temperature Disinfectants</i> (GWBJDH [2020] No.1062). 2. Disinfection treatment shall be carried out in strict accordance with the use scope and the use method. It is strictly prohibited to use disinfectants beyond the scope. It is recommended to determine the content of active ingredients (chlorine-containing disinfectant) before use. 3. During mechanized low-temperature disinfection, the disinfection equipment shall be commissioned to reasonably match the low-temperature disinfectant, to ensure that the low-temperature disinfectant fully covers the six sides of the outer package; When the disinfectant is used for the first time, the on-site disinfection effect evaluation shall be made and the disinfection effect shall be qualified before use. 4. During low-temperature disinfection, the technical training of disinfection workers shall be strengthened to ensure that the disinfection operation is standardized to achieve full coverage of disinfectants. 5. Organic matter has a greater impact on the disinfection effect. When the disinfection object is seriously contaminated, rinse or soak with low-temperature disinfectant before treatment. It is strictly prohibited to use spraying or
Chlorine dioxide Low-temperature disinfectant	Chlorine dioxide	1. Disinfection methods: spraying disinfection, wiping disinfection. 2. Disinfectant action dose: Strictly follow the product instructions for use.	
Peroxides Low-temperature disinfectant	Hydrogen peroxide or peroxyacetic acid	1. Disinfection methods: spraying disinfection, soaking disinfection, wiping disinfection. 2. Disinfectant action dose: Strictly follow the product instructions for use.	
Quaternary ammonium salts Low-temperature disinfectant	Quaternary ammonium salt	1. Disinfection methods: spraying disinfection, soaking disinfection, wiping disinfection. 2. Disinfectant action dose: Strictly follow the product instructions for use.	

		<p>wiping methods for disinfection.</p> <p>6. During preparation, subpackage and use of low-temperature disinfectants, personal protection shall be strictly carried out, such as wearing work clothes, masks, and gloves, to avoid skin contact.</p> <p>7. Low-temperature disinfectants are for external use, shall not be taken orally, and shall be placed out of the reach of children. If splashed in the eyes, they shall be flushed with water immediately, and in serious cases, medical attention shall be taken immediately. They shall not be in contact with flammables and shall be kept away from fire sources.</p>
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## Appendix 2

# Principles of Evaluation and Guidance for Low-temperature Disinfection on Cold-chain Food Outer Packaging Site

### I. Evaluation Principles

The evaluation of on-site low-temperature disinfection includes process evaluation and effect evaluation. Each low-temperature disinfection shall be subject to process evaluation, which is generally self-checked and self-evaluated by the disinfection implementation unit. The relevant regulatory departments may conduct random checks on the disinfection process and the self-check and self-evaluation process to ensure that the disinfection process is effective, and the evaluation of the effect is generally conducted by means of regular random checks, which is recommended to be evaluated every six months. When the low-temperature disinfection method is changed, the disinfection effect shall be evaluated and proven to be effective before use.

### II. Process Evaluation of On-site Low-temperature Disinfection

Disinfection implementation units shall make disinfection records and conduct self-evaluation in each disinfection process to evaluate whether the entire disinfection operation is executed according to the disinfection work plan, whether the low-temperature disinfection products used are legal and effective, whether the disinfection method matches the disinfection object and environment, whether the disinfection sites are fully covered, whether the amount used meets the requirements, whether the disinfection action time is sufficient, and whether the disinfection records are standardized, etc. Contents include but are not limited to disinfection date, disinfection location, disinfection scope, disinfection object, disinfection procedure, disinfectant preparation, disinfectant concentration and dosage, action time, disinfection method, use of disinfection equipment, personal protection, etc.

Low-temperature disinfection products used shall meet the requirements of the relevant national health standards and codes, and the health and safety evaluation shall be qualified. Disinfectant information includes disinfectant name, main active ingredient and its content, expiration date, preparation method, use scope, use method, etc.; Disinfection equipment information includes equipment name, main bactericidal factor and its strength, use scope, use method, etc.

### III. Effect Evaluation of On-site Low-temperature Disinfection

#### (I) Evaluation objects and indicators

The evaluation object of the low-temperature disinfection effect is the object surface, and the indicator microorganism shall be selected according to the resistance of novel coronavirus to the disinfection factor, and the killing rate of the indicator microorganism shall be used as the evaluation index. The resistance of the indicator microorganism shall be equivalent to or higher than that of the novel coronavirus, easy to cultivate and meet the requirements of laboratory biosafety and WS/T 683. For chemical disinfection, staphylococcus aureus (ATCC 6538) and escherichia coli (8099) are available. For physical disinfection, the indicator microorganisms that meet the above requirements shall be selected according to the characteristics of the disinfection factors.

#### (II) Evaluation method

Prepare experimental bacterial tablets according to GB/T 38502 (tryptone soy broth medium shall be used as organic interferent for the evaluation of low-temperature on-site disinfection effect), so that the recovered bacterial count of each tablet is  $1 \times 10^6$  CFU/tablet -  $5 \times$



106CFU/tablet. Place the indicator microorganism tablets into the corresponding low-temperature environment for at least 30 min to ensure that the indicator microorganisms reach the same low temperature before proceeding to the next step.

Before disinfection: the bacterial tablets shall be placed on the site with the desktop, door handles, buttons, etc. as the key objects, and each type of objects shall have two samples at least; For cold-chain food outer package, points shall be arranged on the six sides of the outer package; The total number of test samples shall not be less than 30.

After disinfection: After the disinfection time is over, use sterile forceps to transfer the tablets into a test tube containing 5.0 mL of the corresponding neutralizer, and vibrate the tube in the palm 80 times or mix them well with a mixer for 10-min neutralization. In addition, a positive control group shall be established.

Culture in laboratory: Shake the sampling tube on the mixer for 20s or 80 times, inoculate 1.0mL of the sample to be tested in sterile dishes, inoculate 2 dishes in parallel for each sample, add 15mL - 18mL of dissolved 45°C - 48°C culture medium, and shake evenly while pouring. After the agar solidifies, incubate them at 36°C ± 1°C for 48 h, then count the number of bacterial colonies and calculate the killing rate.

#### (III) Result determination

The disinfection is qualified if the average killing rate of indicator microorganisms on the surface of the object is ≥99.9% and the number of samples with a killing rate ≥99.9% accounts for more than 90%.

#### **IV. Precautions**

(I) In combination with the characteristics of the place, clear disinfection objects, and carry out disinfection work normatively in strict accordance with the disinfection procedures.

(II) Disinfection implementation units shall have on-site disinfection capabilities, and operators shall receive professional training in disinfection, master the basic knowledge of disinfection and personal protection, and be familiar with the use of disinfection equipment and the preparation of disinfectants, etc.

(III) All on-site disinfection shall be documented and kept for at least 2 years with self-monitor at the same time. Standardized operation shall be carried out during the evaluation of disinfection effect, and harmless treatment of samples and relevant test materials shall be carried out in strict accordance with biosafety requirements.

(IV) Personal protection shall be provided during site disinfection, and regular and effective personal protective equipment shall be selected according to site conditions and relevant standards.