

ICS 65.020.01

CCS B 16



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

**GB/T 47385-2026**

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**Technical specification for phytosanitary treatments -  
Temperature treatment**

植物检疫温度控制处理技术规范

**Issued on: April 30, 2026**

**Implemented on: November 1, 2026**

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**Issued by: State Administration for Market Regulation;  
Standardization Administration of the PRC**

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### Foreword

GB/T 47385-2026 | Technical specification for phytosanitary treatments on temperature treatment

GB/T 47385-2026 English version. Technical specification for phytosanitary treatments on temperature treatment ICS

16 National Standards of the People's Republic of China Plant Quarantine Temperature Control Treatment Technical Specifications Published on 2026-04-

30 Implemented on 2026-11-

01 State Administration for Market Regulation The State Administration for Standardization issued a statement.

1.Scope This document specifies the types of temperature control treatments for plant quarantine, technical requirements, calibration and installation of testing equipment, and the creation of temperature distribution maps. The requirements include implementation, post-treatment measures, result determination, document preparation, and record retention. This document applies to operations involving temperature-controlled treatment of specific pests.

### 4 Processing Type

4.1 Cold treatment Cold treatment can be implemented during transport (e.g., in refrigerated cargo holds or inside refrigerated shipping containers). Treatment can be initiated before shipment. The process should be completed before or at the point of entry. Before processing begins, the goods should be pre-cooled to the predetermined processing temperature. The goods should... Post-treatment protection measures should be implemented throughout the entire handling, transportation, and storage process. Cold treatment can be used in conjunction with chemical treatments (such as fumigation).

## 4.2 Heat Treatment

**4.2.1 Hot water treatment** Hot water treatment is mainly suitable for fruits and vegetables that serve as hosts for endophytic and ectopic pests (such as fruit flies and mealybugs), and can also be used for cultivation. Plants used for cultivation (such as ornamental bulbs, grape propagation material) and certain seeds (such as rice and ornamental palm seeds).

**4.2.2 Steam heat treatment** The high thermal energy of humid air in heat treatment allows for higher processing efficiency compared to dry air. Relatively dry hot air can be used. The air heats the entire product from room temperature to the required temperature, and then maintains the processing time in humid air slightly below the dew point to prevent water vapor condensation. This treatment is suitable for plant products that tolerate high humidity but are easily damaged by drying, such as fruits, vegetables, and flower bulbs, and can also be used on wood products. deal with.

**4.2.3 Dry heat treatment** Dry heat treatment is mainly suitable for commodities with low moisture content that do not come into contact with water, such as seeds, grains and wood.

**4.2.4 Dielectric heating treatment** Dielectric heating treatment can be achieved by applying microwave and radio frequency electromagnetic waves within the treatment frequency range. Compared to traditional heating technologies, dielectric heating can generate heat inside the product (including the core components), and the heat is transferred outward through convection and conduction. This allows for diffusion, thus shortening processing time. Thermal radiation typically causes the internal temperature of the product to be higher than its surface temperature. Dielectric heating has a high efficiency for selectively heating moist substances (such as pests) in relatively dry commodities (such as wood and grains). Theoretical efficiency.

**5. Technical requirements for the treatment plan** The treatment plan should specify the requirements for pretreatment and posttreatment (such as precooling, preheating, gradual heating, rapid cooling, etc.), as well as the handling of treatment failures. Emergency procedures and corrective action guidelines are provided, and technical specifications for handling are detailed in Appendix A. When initiating or completing treatment during transport, the process should be followed from the start of treatment until... Destination, and post-treatment contamination protection measures for goods. When implementing temperature-controlled processing, key factors such as processing temperature, processing duration, packaging, the permeability of the processed medium, and the logistics environment should be controlled. The parameters should meet the relevant requirements of ISPM

28. Where necessary, the humidity of the processing environment or the moisture content of the product should also be included. If the size, type, or modified atmosphere created by the packaging may affect processing efficiency, its actual impact should be assessed. The selected packaging should allow... It allows the processing medium (cold air, hot air, hot

water, steam, etc.) to effectively penetrate and act evenly on the entire product being processed. When the handling procedure requires maintaining the minimum humidity level, the impermeable packaging material should be removed, opened, or appropriately punctured until the humidity reaches the required level. Require.

6. Calibration, installation, and temperature distribution mapping of testing equipment.

6.1 Calibration Temperature and humidity monitoring equipment should be calibrated according to the prescribed cycle, and the calibration operation should comply with the relevant metrological technical specifications. (During cold treatment) In the process, an ice-water mixture can be used for on-site calibration, and the deviation of the three readings should be less than or equal to  $\pm 0.3^{\circ}\text{C}$ .

## 6.2 Installation of Temperature Sensor

6.2.1 Placement of Temperature Monitoring Sensor Except for dielectric heating treatment, temperature monitoring sensors should be placed in the area where the core temperature of the product takes the longest to reach the target requirement (such as the center of the tray). Or the center of the fruit). For mixed-load goods (such as fresh lemons and oranges), each should be monitored separately by sensors to ensure that all categories of goods are monitored. All products met the specified processing temperature and processing time. The sensor should be secured in a way that prevents accidental displacement and does not impede heat transfer. The sensor should be completely enclosed by the product. For core sensors that are not fully enclosed, heat-resistant insulating material should be used to seal them in the insertion hole. The sensor should not be placed near metal objects (such as nails). For small items such as cherries and grapes, the sensor should be inserted into the fruit. The sensor measures the temperature, with the core temperature as the standard. For large items, the sensor should be placed inside the largest object that needs to reach the processing temperature for the longest time.

6.2.2 Cold treatment Before processing, the goods should be placed in a cold storage and pre-cooled until they reach the same temperature as the goods for cold treatment. Cold treatment should involve monitoring the core temperature of the goods and ensuring adequate air circulation to maintain a uniform processing temperature. The required number of sensors depends on the processing plan, product size, product type, temperature uniformity measurement results, processing facility size and type, etc. Factors have been identified. Testing air temperature cannot replace testing product temperature. Temperature control should utilize at least three sensors, taking into account the detection of outlet air temperature, or be configured according to the density, composition, and load of the goods. The number of sensors should be increased based on factors such as placement. Additional sensors should be installed according to temperature mapping results to compensate for any potential transmission issues, including one or more sensors. Sensor malfunction.

**6.2.3 Hot water soaking treatment** Hot water immersion treatment should involve monitoring water temperature and maintaining water circulation to ensure the goods are completely submerged and the water temperature remains uniform. This is used to monitor water temperature uniformity. The sensor should be completely submerged in water. Whether or not a sensor needs to be installed in the product depends on the handling requirements. If necessary, the largest volume sensor should be selected. Sensors are used to place a quantity of goods.

**6.2.4 Steam heat treatment** During heat treatment, the air temperature, relative humidity, and core temperature of the goods within the facility should be monitored, and adequate air circulation should be maintained. Temperature and relative humidity should be kept uniform. The number of sensors required depends on factors such as temperature uniformity measurement results, product size, configuration, and type of processing facility. [Selection should be made based on these factors.] Place the sensor on the largest item, and position the sensor in the location with the lowest temperature among the items and the heat treatment facility. The main parameters to be processed should include.

---Heating time. The time it takes for the temperature sensor to reach the minimum temperature required for product pre-processing;

---Minimum Product Temperature. The minimum temperature that the core temperature sensors for all products are required to reach;

---Isothermal holding time. All product temperature sensors should maintain the lowest core temperature, and the air temperature sensor should maintain the lowest air temperature. Duration;

---Total heat treatment time. The total time from the start of heating the product to the end of the constant temperature period;

---Humidity control parameters during processing;

---Post-processing cooling method.

**6.2.5 Dry heat treatment** Dry heat treatment should involve monitoring the air temperature, humidity, and core temperature of the goods within the treatment facility, ensuring adequate air circulation, and maintaining the facility's stability. A state of uniform temperature and relative humidity. For dry heat treatment solutions involving temperature and humidity control requirements, temperature sensors should be used to monitor air temperature, and dry-bulb and wet-bulb thermometers should be used. A thermometer or humidity sensor monitors humidity. The sensor should be kept away from heat sources and walls of processing facilities. Additional sensors may be installed to compensate for potential condensation. The sensor malfunctioned. Dry heat treatment should be equipped with at least three temperature sensors, placed in the lowest temperature location within the product and heat treatment facility. (Total number of sensors) Adjustments should be made