

Requirements for In-Transit Cold Disinfestation Treatment
Attached to Notification of Department of Agriculture
Re: Conditions for Import of Apple Fruit from the Republic of South Africa
B.E. 2567 (2024)

1. Requirements for Containers

- (1) Container's types and series must be suitable for in-transit cold disinfestation treatment.
- (2) Containers must be self-refrigerated shipping containers and must be equipped with a recording device. The NPPO is responsible for ensuring that containers used by exporters are of a suitable type, and have refrigerator equipment capable of achieving and holding the required temperatures.

2. Requirements for Temperature Recording System

The NPPO must ensure that temperature recording system, the combination of the cold treatment data recorders and fruit pulp temperature sensors, must meet the following criteria:

- (1) The system must be suitable for cold disinfestation treatment. The accuracy of the system must be within plus or minus 0.3 °C of the true temperature in the range of minus 3 °C to plus 3 °C.
- (2) The system must be capable of automatic operation and able to accommodate a minimum of three fruit temperature sensors.
- (3) The system must be capable of continuous recording of date, time, sensor number, and temperature during all calibrations and for the duration of treatment period.
- (4) The system must be capable of recording all temperature sensors at least once every hourly, with a resolution of 0.1 °C and storing data until the information can be examined by the DOA officer.
- (5) The system must be capable of producing printout which identifies each sensor, time and the temperature, as well as the identification number of the recorder and the container.

3. Requirements for Temperature Sensors

- (1) Sensor's type must have an optimal accuracy for the temperature range of this cold treatment.
- (2) Sensors must have an outer sheath diameter of 6.4 millimeters or less. The sensing unit must be located within the first 25 millimeters or less of the sensor's tip. Sensors must be accurate to within plus or minus 0.3 °C in the range of minus 3 °C to plus 3 °C.
- (3) Each sensor must be tagged with a number identical to sensor's number accompanying it readings in the printout produced by the temperature recording system.

4. Calibration of Temperature Sensors

- (1) Calibration of the temperature sensors must be conducted under the supervision of the NPPO.
- (2) Calibration must be conducted using a mixture of crushed ice and distilled water in clean insulated container prior to the temperature sensors being placed in fruit.
- (3) Crushed ice must completely fill the container. Enough water should be added to stir the mixture. The percentage of ice is estimated at 80-85 percent while the water fills the air voids (15-20 percent).
- (4) The mixture must be thoroughly stirred to ensure the water is completely cooled and good mixing has occurred. At least 10 minutes of adaptation period, is required to reach a steady state of 0 °C.

- (5) During the calibration, all the temperature sensors and the calibrated thermometer must be immersed in the ice water slurry without touching the sides or bottom of the container. The mixture must be constantly stirred while testing is being carried out. Only after the readings are stabilized at the lowest constant temperature, the calibration readings can be conducted.
- (6) Two consecutive reading must be recorded for each sensor at the lowest temperature obtainable. There shall be at least a 60 second interval between the two readings for any one sensor; however, the interval should not exceed 5 minutes. The variance between the two readings must not exceed 0.1 °C.
- (7) Any sensor which reading shows a deviation of more than plus and minus 0.3 °C from the standard 0 °C must be replaced and rejected for further use for cold treatment.
- (8) A “Certificate of calibration for in-transit cold disinfestation treatment in self-refrigerated container” as shown in the **Annex 3** must be prepared for each container by the NPPO officer. The original copy must be attached to the phytosanitary certificate which accompanies the consignment.

Annex 3

Certificate of Calibration for In-Transit Cold Disinfestation Treatment
in Self-Refrigerated Container
Attached to Notification of Department of Agriculture
Re: Conditions for Import of Apple Fruit from the Republic of South Africa
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Exporter name:
 Phytosanitary certificate number:
 Container number:
 Container seal number:
 Recorder serial number:
 Container clock set to GMT:
 Date calibrated (dd/mm/yy):

1. Sensor calibration (at 0 °C):

Sensor Identification	1 st Reading	2 nd Reading	Correction factor
1			
2			
3			

2. Sensor placement:

Sensor placement	Pulp temperature (°C)
1	
2	
3	

3. Container sealed:

Local time: Date (dd/mm/yy):

.....
 Inspector name Inspector signature Stamp

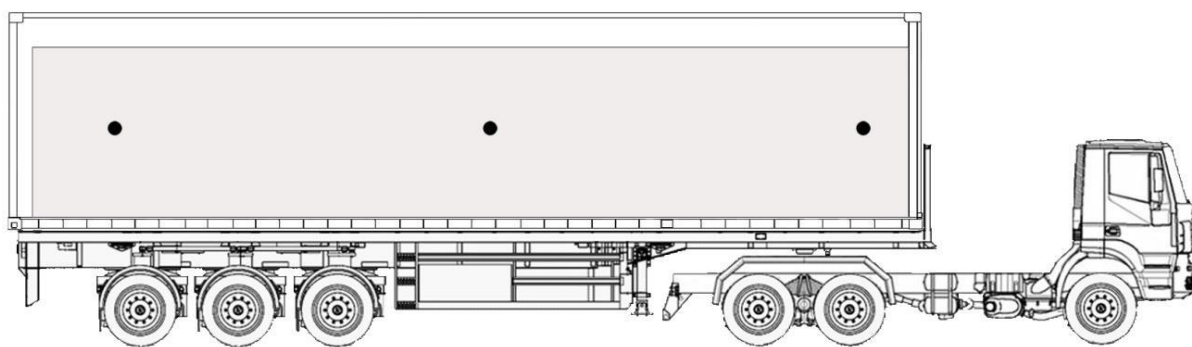
5. Placement of Temperature Sensors

- (1) Loading of packed fruit into containers and placement of temperature sensors must be conducted under the supervision of the NPPO.
- (2) Containers must be packed in an appropriate manner which ensures that there is even airflow under and around all pallets and loose stacked cartons.
- (3) Records for in-transit cold disinfestation treatment are required at least three temperature sensors to monitor innermost fruit pulp temperature in a container. These sensors must be distributed throughout the fruit in a representative cross section of the container that enables an adequate monitoring of the temperature.
- (4) The temperature sensor used to measure the fruit pulp temperature must be inserted carefully into the center of a test fruit. The test fruit shall be selected from the largest fruit size in the lot. With small fruit, the sensor shall penetrate two or more fruit. The sensor's tip must not be extended beyond the fruit, as well as fruit rupture and opened by sensor insertion, to prevent measuring air temperature instead of fruit pulp temperature. In these cases, the cold treatment is rejected.
- (5) Fruit temperature sensors must be placed in a 6 meter (20 foot) container and a 12 meter (40 foot) container in the following locations, as depicted in **Figure 1**.
 - (a) Two fruit pulp temperature sensors must be placed in boxes diagonally opposite at the side walls approximately 1 meter from the end of the load for a 6 meter container and approximately 1.5 meters from the end of the load for a 12 meter container.
 - (b) One fruit pulp temperature sensor must be placed in a box in the center of the container.
 - (c) All three sensors must be placed at mid-height of the stack.

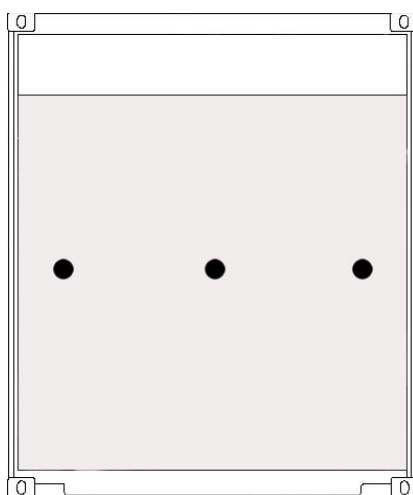
6. Sealing of Containers

- (1) After completion of loading, the container door must be closed properly and sealed with a numbered metal seal under the NPPO supervision. The seal must be intact until arrival at the port of entry in the Kingdom of Thailand, where the DOA inspectors only are authorized to open it. Containers with a broken seal must be rejected.
- (2) The seal number must be recorded on the phytosanitary certificate.

SIDE VIEW

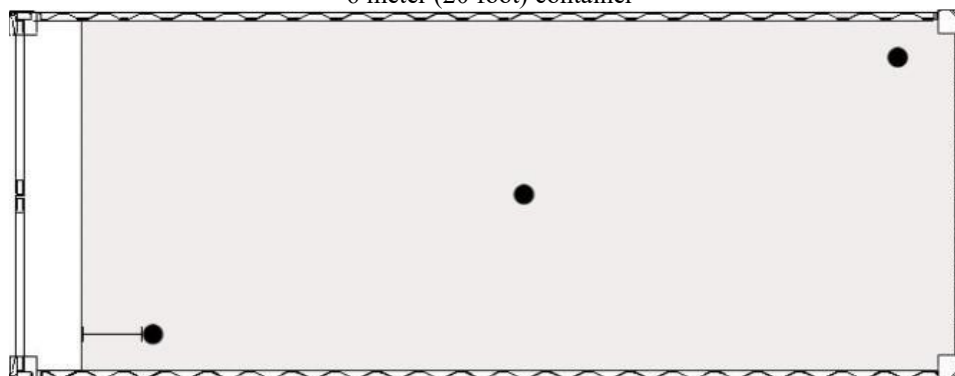


DOOR VIEW



TOP VIEW

6 meter (20 foot) container



TOP VIEW

12 meter (40 foot) container

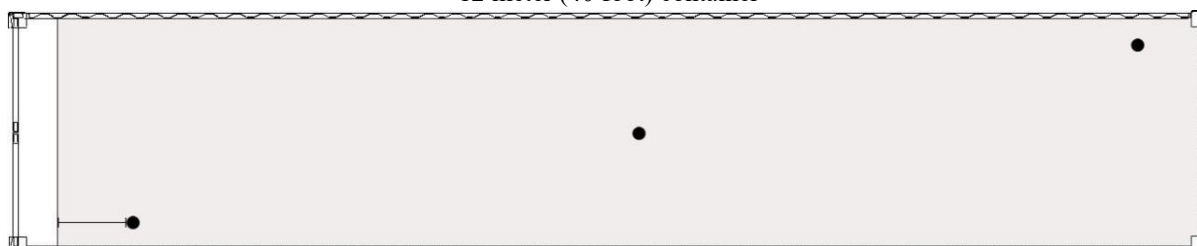


Figure 1. Placement of fruit temperature sensors in a container for in-transit cold disinfestation treatment.

7. Confirmation of Treatment

- (1) The in-transit arrangement is for the cold disinfestation treatment to be completed during the voyage between exporting country and the port of discharge in the Kingdom of Thailand. The Shipping Company shall download the computer records of the cold disinfestation treatment and forward them to officer at port of entry.
 - (2) The DOA Bangkok Office must verify whether the treatment records meet disinfestation requirements and advise the DOA officer at the port of arrival that, subject to calibration of sensors, the treatment is complete.
 - (3) On arrival DOA must check the calibration of the fruit temperature sensors using the method referred to in Section 4 and verify that the treatment records meet disinfestation requirements.
 - (4) Re-calibration of the fruit sensors at the completion of the treatment which shows a higher than initial calibration setting, the recordings from the probe(s) will be adjusted accordingly.
 - (5) If this adjustment reveals that the nominated treatment schedule was not met, the treatment will be deemed to have failed. The consignment must be re-exported or destroyed at the importer's expenses.
8. The Perishable Products Export Control Board (PPECB) is appointed by the Department of Agriculture, Land Reform and Rural Development (DALRRD), NPPO of the Republic of South Africa as an assignee under the *Agricultural Product Standards Act, 1990* (Act No. 119 of 1990). The PPECB is authorized to perform specific functions referred to in Section 4, Section 5 and Section 6 under this requirement on behalf of the DALRRD.