



# REFERENCE

## Performance standards – onshore cold treatment – horticulture exports

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### Purpose of this document

This document:

- outlines the performance standards onshore cold treatment facilities must meet to gain and maintain registration for the treatment of goods for export
- sets the non-compliance ratings for those performance standards
- must be read in line with
  - [Australian phytosanitary treatment application standard for cold disinfestation](#),
  - Guideline: [Audit of plant export registered establishments](#)
  - Guideline: [Maintenance of phytosanitary security for horticulture exports](#)
  - Guideline: [Management of plant export registered establishments](#).

## Definitions

The following table defines the terms used in this document.

Term	Definition
Activity categories	Activities and requirements from the Australian phytosanitary treatment application standard for cold disinfestation treatment that have been grouped by function.
Checklist item	Requirements under the activity categories that have been grouped by function and non-compliance rating.
Documented system	A written process or procedure that defines the steps in a process and who is responsible for those steps. <b>Note:</b> This includes the records used to confirm the process is being followed.
Goods	Goods declared by the regulations to be prescribed goods for the purposes of the <i>Export Control Act 2020</i> .
Performance standards	A benchmark derived from legislation and departmental requirements against which actual performance of third parties is measured.

## Performance standards

### Structural and treatment equipment requirements

The following table describes the performance standards and non-compliance ratings for structural and treatment equipment for onshore cold treatment providers.

Checklist items	Performance standards – structural and treatment equipment	Reference to standard	Non-compliance rating
1.1 Treatment chambers	Treatment chambers must be: <ul style="list-style-type: none"><li>• a permanent structure</li><li>• clean and pest free</li><li>• have the ability to reach and maintain required temperatures.</li></ul>	<ul style="list-style-type: none"><li>• 2.1.1</li><li>• 2.1.</li><li>• 2.1.4</li></ul>	Critical
1.2.1 Chamber security	Treatment chambers must maintain phytosanitary security of goods post treatment.	2.1.3	Critical
1.2.2 Chamber security	Treatment chambers must: <ul style="list-style-type: none"><li>• have the ability to be sealed with a numbered seal</li><li>• have lockable doors.</li></ul>	<ul style="list-style-type: none"><li>• 2.1</li><li>• 3.7</li></ul>	Major

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Checklist items	Performance standards – structural and treatment equipment	Reference to standard	Non-compliance rating
1.3 Temperature recording equipment	Temperature recording equipment must: <ul style="list-style-type: none"> <li>• be secure from tampering</li> <li>• be accessible from outside the treatment chamber</li> <li>• accommodate the required number of sensors</li> <li>• be tamper evident and/or tamper proof</li> <li>• record all temperature sensors at least hourly with readings graduated to 0.1 of a degree Celsius</li> <li>• record data regularly for the duration of the treatment</li> <li>• store data for the duration of the treatment and as long as necessary after the treatment is complete to allow for verification</li> <li>• produce reports which identify each sensor, time and temperature</li> <li>• identify the chamber where the treatment was undertaken.</li> </ul> <p><b>Important:</b> Temperature recording records must be kept for two years.</p>	<ul style="list-style-type: none"> <li>• 2.1.3</li> <li>• 2.3</li> </ul>	Major
1.4 Temperature sensors	Temperature sensors must: <ul style="list-style-type: none"> <li>• have the ability to continuously record</li> <li>• have unique identification</li> <li>• be distinguished as an air sensor or product sensor</li> <li>• be able to be secured against movement or damage</li> <li>• be accurate to <math>\pm 0.3</math> °C unless otherwise prescribed by the importing authority.</li> </ul>	2.2	Major

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Checklist items	Performance standards – structural and treatment equipment	Reference to standard	Non-compliance rating
1.5 Treatment chamber construction plans	Up-to-date plans for the treatment chamber including: <ul style="list-style-type: none"> <li>• identifying name/number of cool rooms</li> <li>• dimensions of treatment chambers</li> <li>• capacity of treatment chambers</li> <li>• insulation used (walls, ceiling and floor)</li> <li>• make and model of refrigeration condenser and evaporator</li> <li>• capacity of refrigeration condenser and evaporator</li> <li>• temperature range of the equipment, defrost cycle specifications</li> <li>• type of temperature recording equipment</li> <li>• location of sensors and recording equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• 5</li> <li>• 6</li> </ul>	Minor

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## Procedures

The following table describes the performance standards and non-compliance ratings for procedures for onshore cold treatment providers.

Checklist items	Performance standards – procedures	Reference to standard	Non-compliance rating
2.1 Pre-cooling	Fruit pulp must be at the treatment temperature before treatment begins.	3.1	<ul style="list-style-type: none"> <li>• Major or</li> <li>• Critical</li> </ul>
2.2 Number of sensors	<p>Has the minimum number of required sensors in each treatment chamber.</p> <p><b>Note:</b> In the absence of importing country requirements the minimum number of required sensors are:</p> <ul style="list-style-type: none"> <li>• four (4) product sensors</li> <li>• two (2) airflow sensors.</li> </ul>	3.2	Critical
2.3.1 Calibration of sensors	<p>Calibration must be conducted in line with the USDA Treatment manual s3-7-4 (Annex A of the treatment standard). A calibrated thermometer capable of reading to one decimal point Celsius is required to verify ice slurry temperatures.</p> <p><b>Important:</b></p> <ul style="list-style-type: none"> <li>• Product sensors must be calibrated               <ul style="list-style-type: none"> <li>○ prior to every treatment</li> <li>○ after every treatment</li> <li>○ by a suitably trained individual.</li> </ul> </li> <li>• Product sensor calibration must be demonstrated at audit.</li> </ul>	<ul style="list-style-type: none"> <li>• 3.3</li> <li>• Annex A</li> </ul>	Critical
2.3.2 Calibration of sensors	<p>Unless specified by the importing country, air sensors must be calibrated:</p> <ul style="list-style-type: none"> <li>• twice annually</li> <li>• by a suitably trained individual.</li> </ul> <p><b>Important:</b> Air sensor results must be recorded.</p>	<ul style="list-style-type: none"> <li>• 3.3</li> <li>• Annex A</li> </ul>	Minor

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Checklist items	Performance standards – procedures	Reference to standard	Non-compliance rating
2.4.1 Loading the treatment chamber	The treatment chamber is packed in a manner which ensures even airflow. <b>Note:</b> Demonstration loading of the treatment chamber may be required if the plant export program or Audit and Assurance Group (AAG) deem it necessary.	3.4	Major
2.4.2 Loading the treatment chamber	Treatment chamber is locked and secured with a numbered seal.	2.1	Major
2.4.3 Loading the treatment chamber	<ul style="list-style-type: none"> <li>• Treatment loads do not contain more than one product (unless specifically permitted by the importing country).</li> <li>• Where more than one product is permitted to be treated at the same time <ul style="list-style-type: none"> <li>○ there must be at least one probe in each different product</li> <li>○ the most stringent time and temperature requirements must be applied to the entire load. That is, the lowest temperature and longest time derived from the treatment schedules of the products being loaded.</li> </ul> </li> </ul>	3.5	<ul style="list-style-type: none"> <li>• Minor or</li> <li>• Major or</li> <li>• Critical</li> </ul>
2.5.1 Placement of temperature sensors	Has a system in place to check importing country requirements for temperature sensor placement.	3.6	Major
2.5.2 Placement of temperature sensors	<p>Unless specified by a protocol the requirements for placement of temperature sensors are:</p> <ul style="list-style-type: none"> <li>• two airflow sensors at the inlet and the outlet points of cold air, to measure chamber temperature</li> <li>• four product sensors placed in <ul style="list-style-type: none"> <li>○ the corner of the top stack in the warmest part of the treatment chamber</li> <li>○ the centre of the stack in the warmest part of the treatment chamber</li> </ul> </li> </ul> <p><b>Note:</b> Further sensors will be placed in different areas of the treatment chamber where temperature or airflow may be impacted and placed from midway to the top height of the stack.</p> <p><b>Important:</b> Sensor placement must be demonstrated at audit.</p>	3.6	Major

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Checklist items	Performance standards – procedures	Reference to standard	Non-compliance rating
2.5.3 Placement of temperature sensors	<ul style="list-style-type: none"> <li>• Product sensors must be placed in the fruit being treated and               <ul style="list-style-type: none"> <li>○ have as much of the sensor covered as possible</li> <li>○ the tip of the sensor does not extend beyond the fruit</li> <li>○ the tip on the sensor remains inside the product</li> <li>○ secured to avoid dislodgement, any material used to secure the sensor must not affect the thermal conductivity.</li> </ul> </li> <li>• Product sensors must be placed to be representative of the lot with at least one sensor placed in the largest product variety being treated.</li> </ul> <p><b>Important:</b> Sensor placement must be demonstrated at audit.</p>	<ul style="list-style-type: none"> <li>• 3.6</li> <li>• Figure 2</li> </ul>	Major
2.5.4 Placement of temperature sensors	<ul style="list-style-type: none"> <li>• Has a diagram identifying the sensors.</li> <li>• Has a diagram demonstrating correct placement for product sensors. The diagram is located in an easy-to-access spot.</li> </ul>	<ul style="list-style-type: none"> <li>• 3.6.4</li> <li>• 3.6.2</li> <li>• 6</li> <li>• Figure 1</li> </ul>	Minor
2.6 Treatment period	<ul style="list-style-type: none"> <li>• Ensures the correct treatment schedule is applied.</li> <li>• Has temperature records that demonstrate prescribed treatment times have been met.</li> </ul>	3.7	Critical

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## Verification of treatment

The following table describes the performance standards and non-compliance ratings for verification of treatment for onshore cold treatment providers.

Checklist items	Performance standards – Verification of treatment	Reference to standard	Non-compliance rating
3.1 Sensor recalibration	<p>Treatment sensors calibrated post treatment meet the required variation allowed in the standard or importing country requirement.</p> <p><b>Note:</b> A demonstration of sensor recalibration may be required if the plant export program or AAG deem it necessary.</p>	4.2	Critical
3.2.1 Treatment failure	<p>Explains when a treatment may be deemed to have failed:</p> <ul style="list-style-type: none"> <li>• treatment chamber seal has been tampered with</li> <li>• temperature sensors are placed incorrectly in the treatment chamber</li> <li>• temperature sensors are placed incorrectly in the fruit pulp</li> <li>• if one or more temperature sensors fails to record for four (4) hours or more</li> <li>• temperature records show that the temperature and/or time required by the nominated treatment schedule has not been met</li> <li>• if one or more sensors fail recalibration.</li> </ul>	4.3	Critical
3.2.2 Treatment failure	<p>Has procedures in place to identify treatment failures, may include circumstances where treatments can restart.</p>	4.3	Major

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## Phytosanitary security measures

The following table describes the performance standards actions and non-compliance ratings for phytosanitary security measures for onshore cold treatment providers.

Checklist items	Performance standards - Phytosanitary security measures	Reference to Standard:	Non-compliance rating
4.1 Segregation of goods	Treated goods must be: <ul style="list-style-type: none"> <li>• identified</li> <li>• segregated from other goods in line with Guideline: <a href="#">Management of plant export registered establishments</a> and Guideline: <a href="#">Maintenance of phytosanitary security for horticulture exports</a>.</li> </ul>	5.2	Critical
4.2 Traceability	Can demonstrate traceability of the goods: <ul style="list-style-type: none"> <li>• back to the packhouse</li> <li>• (if required) back to the grower.</li> </ul>	5.2	Major
4.3 Post treatment phytosanitary security	Post treatment area must: <ul style="list-style-type: none"> <li>• be clean and pest free</li> <li>• have systems in place to prevent insect infestation or re-infestation of goods in line with Guideline: <a href="#">Management of plant export registered establishments</a> and Guideline: <a href="#">Maintenance of phytosanitary security for horticulture exports</a>.</li> </ul>	5.2	<ul style="list-style-type: none"> <li>• Major or</li> <li>• Critical</li> </ul>
4.4 Goods packed post treatment	If goods are treated in bulk and packed post treatment there must be procedures in place to ensure the post treatment pathway, including transport and packhouse is maintained free from regulated pests.	5.2	<ul style="list-style-type: none"> <li>• Major or</li> <li>• Critical</li> </ul>

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## Documentation

The following table describes the performance standards and non-compliance ratings for documentation for onshore cold treatment providers.

Checklist items	Performance standards – documentation	Reference to standard	Non-compliance rating
5.1 Documented systems	<p>The following procedures must be documented, current and being followed by the relevant staff:</p> <ul style="list-style-type: none"> <li>• treatment procedures including               <ul style="list-style-type: none"> <li>○ chamber security, including dealing with tampered/broken seals</li> <li>○ pre-cooling processes</li> <li>○ sensor calibration, including what happens when calibrations fail</li> <li>○ consignment failures.</li> </ul> </li> <li>• phytosanitary security procedure as per Guideline: <a href="#">Maintenance of phytosanitary security for horticulture exports</a>, including               <ul style="list-style-type: none"> <li>○ pre-treatment security, if the goods have an existing phytosanitary status (infield controls etc.)</li> <li>○ post treatment security</li> <li>○ load out security</li> <li>○ security during phytosanitary inspection, if relevant.</li> </ul> </li> <li>• traceability procedures as per Guideline: <a href="#">Management of plant export registered establishments</a>.</li> </ul>	<ul style="list-style-type: none"> <li>• 6</li> <li>• 3.3</li> <li>• 3.8</li> </ul>	Major

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Checklist items	Performance standards – documentation	Reference to standard	Non-compliance rating
5.2.1 Records	<p>The following information must be on treatment records:</p> <ul style="list-style-type: none"> <li>• registered establishment number</li> <li>• treatment chamber name or number</li> <li>• temperature recorder serial number</li> <li>• date and time (local) of when the temperature sensors are calibrated</li> <li>• temperature calibration results</li> <li>• sensor identification and placements</li> <li>• date and time the chamber was sealed</li> <li>• treatment chamber seal number</li> <li>• link to certification such as phytosanitary certificate</li> <li>• name and signature of AO certifying the treatment.</li> </ul> <p><b>Important:</b> Records must be kept for two years.</p>	<ul style="list-style-type: none"> <li>• 6</li> <li>• 3.6</li> </ul>	<ul style="list-style-type: none"> <li>• Minor or</li> <li>• Major</li> </ul>
5.2.2 Records	<ul style="list-style-type: none"> <li>• The following traceability records must be kept <ul style="list-style-type: none"> <li>○ receivals</li> <li>○ storage</li> <li>○ dispatch.</li> </ul> </li> </ul> <p><b>Important:</b> Records must be kept for two years.</p>	<ul style="list-style-type: none"> <li>• 6</li> <li>• 5.2</li> </ul>	Major

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Checklist items	Performance standards – documentation	Reference to standard	Non-compliance rating
5.3 Training Records	<ul style="list-style-type: none"> <li>• Training records must be kept for staff undertaking the following task               <ul style="list-style-type: none"> <li>○ calibration of sensors</li> <li>○ placement of sensors</li> <li>○ handling treated goods</li> <li>○ use of software used to monitor treatments.</li> </ul> </li> <li>• Training records must record               <ul style="list-style-type: none"> <li>○ details of the training undertaken</li> <li>○ date the training was completed</li> <li>○ name of the individual that was trained</li> <li>○ evidence of competence.</li> </ul> </li> <li>• If the training was conducted internally all training material must be made available on request.</li> </ul>	<ul style="list-style-type: none"> <li>• 3.3</li> <li>• 3.6</li> <li>• 6</li> </ul>	Minor

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## Additional requirements for protocol markets

The following table outlines the additional county requirements. These criteria must be met to gain access to each market.

Protocol country	Performance standards	Non-compliance rating
All markets	Has a current copy or can access the protocol and/or work plan.	Critical to markets
All markets	Ensures protocol goods for different markets are not treated together. Has a written process and records to support this.	Critical to markets
Thailand	<ul style="list-style-type: none"> <li>Ensures goods of different species are not treated together. Has a written process and records to support this.</li> <li>Documented system for product pathway and treatment process.</li> </ul>	Critical to market
	Conducts a 24 hour empty chamber running test at initial audit for each treatment chamber. <b>Note:</b> Department must observe the set up and start of the initial 24 hour test including calibration of probes.	Critical to market
	<ul style="list-style-type: none"> <li>Conducts 24 hour empty chamber running test annually for each treatment chamber.</li> <li>Record of 24 hour empty chamber running test provided to the department.</li> </ul>	Critical to market
	<b>Sensor placement</b> A minimum of four sensors must be used to measure fruit pulp temperature in the following locations, one at the: <ul style="list-style-type: none"> <li>centre of the stack, in the centre of the cold room</li> <li>corner of the top stack, in the centre of the cold room</li> <li>centre of the stack near the outlet of cold air</li> <li>corner of the top stack near the outlet of cold air.</li> </ul>	Critical to market
China	Temperature sensors must be accurate to $\pm 0.15$ °C in the range of -0.3 °C to 3.0 °C.	Critical to market
	Temperature records (including probe calibration and recalibration records) have been endorsed by the department.	Critical to market

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Protocol country	Performance standards	Non-compliance rating
	<p><b>Sensor placement</b></p> <p>The room temperature shall be measured at least by two probes (at the inlet and the outlet points of air circulation), and at least four probes shall be installed to measure the temperature of fruit flesh and are required to be placed, one at the:</p> <ul style="list-style-type: none"> <li>• centre of the stack in the centre of the cold room</li> <li>• corner of the top stack in the centre of the cold room</li> <li>• centre of the stack near the outlet of cold air</li> <li>• corner of the top stack near the outlet of cold air.</li> </ul>	Critical to market
Korea	<p><b>Additional treatment facility requirements</b></p> <p>Facilities must have the following post treatment security measures:</p> <ul style="list-style-type: none"> <li>• automatic doors</li> <li>• rubber curtains or air curtains at the entrance of cold-treatment facilities</li> <li>• insect proof materials covering all openings such as windows</li> <li>• an enclosed space for loading.</li> </ul>	Critical to market
	Explains when goods intended for export to Korea may be treated concurrently with goods destined for other markets.	Critical to market
	Temperature sensors must be accurate to $\pm 0.1$ °C around 0 °C.	Critical to market
	The fruit pulp temperature at the time of sensor placement must also be stated on treatment records.	Critical to market
Japan	Temperature sensors must maintain precision of $\pm 0.1$ °C at least for the first month after calibration.	Critical to market

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Protocol country	Performance standards	Non-compliance rating
Taiwan	<p><b>Treatment chamber requirement</b></p> <p>The fluctuation of temperature inside the cold treatment facilities shall be within the range of one degree Fahrenheit (1 °F).</p>	Critical to market
	<p>Conducts 24 hour empty chamber running test at initial audit for each treatment chamber.</p> <p><b>Note:</b> Department and Taiwanese NPPO (BAPHIQ) representative must observe the set up and start of the initial 24 hour test including calibration of probes.</p>	Critical to market
New Zealand	<p><b>Sensor requirements</b></p> <p>A minimum of three sensors (two for pulp and one for air temperature) will be used for the first 250 m<sup>3</sup> of product or less. For each additional 250 m<sup>3</sup> of product, or part thereof, one additional pulp sensor will be used.</p>	Critical to market
	<p><b>Sensor placement</b></p> <p>The warmest area of each cool storage facility will be determined during the initial cooling process by the use of sensory probes/thermometers. One pulp sensor will be placed at the warmest area of the cool store. Further sensors will be placed throughout the load in locations representing different areas of the cool store, from midway to the top height of the chamber load.</p>	Critical to market
	<p>The following information must also be on treatment records:</p> <ul style="list-style-type: none"> <li>• date produce was cleared from chamber</li> <li>• details of post treatment security and dispatch.</li> </ul>	Critical to market
	<p>All treated produce must be labelled as treated to ensure traceability.</p>	Critical to market

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Protocol country	Performance standards	Non-compliance rating
Vietnam	Post treatment phytosanitary security: <ul style="list-style-type: none"> <li>• must have metal seals on site</li> <li>• numbered metal seal must be used to seal container used for transport.</li> </ul>	Critical to market
	<b>Sensor placement</b> A minimum of four sensors must be used to measure fruit pulp temperature in the following locations, one at the: <ul style="list-style-type: none"> <li>• centre of the stack, in the centre of the cold room</li> <li>• corner of the top stack, in the centre of the cold room</li> <li>• centre of the stack near the outlet of cold air</li> <li>• corner of the top stack near the outlet of cold air.</li> </ul>	Critical to market

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## Related material

The following related material is available in the [Plant Export Operations Manual](#):

- [Australian phytosanitary treatment application standard for cold disinfestation treatment](#)
- Guideline: [Audit of plant export registered establishments](#)
- Guideline: [Management of plant export registered establishments](#)
- Guideline: [Maintenance of phytosanitary security for horticulture exports](#).

## Document information

The following table contains administrative metadata.

Instructional Material Library document ID	Instructional material owner
IMLS-9-3954	Director, Horticulture Exports

## Version history

The following table details the published date and amendment details for this document.

Version	Date	Amendment details
1.0	23/07/2018	First publication of this reference.
2.0	31/01/2019	<ul style="list-style-type: none"><li>• Minor formatting changes including update to clause numbers to align with the changes to <i>Australian phytosanitary treatment application standard for cold disinfestation treatment</i>. Version 1.1</li><li>• Addition of mixed product consignments standards. Clause 2.4.3</li><li>• Name changed from Performance standards – onshore cold treatment.</li></ul>
3.0	7/03/2019	Amended references to correct guidance documents.
4	18/05/2021	Updated export legislation reference.