© Commonwealth of Australia 2018

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a Creative Commons Attribution 4.0 International Licence except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@agriculture.gov.au.

Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Agriculture and water resources, 2018, Australian phytosanitary treatment application standard for irradiation treatment, Canberra, September. CC BY 4.0.


Department of Agriculture and Water Resources
Postal address GPO Box 858 Canberra ACT 2601
Telephone 1800 900 090
Web agriculture.gov.au

The Australian Government acting through the Department of Agriculture and Water Resources has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture and Water Resources, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Department of Agriculture and Water Resources
## Contents

1. **Introduction** .............................................................................................................................................. 4

   1.1 **Scope**............................................................................................................................................................... 4

2. **Requirements** ........................................................................................................................................... 6

   2.1 **Treatment facility** ...................................................................................................................................... 6

   2.2 **Personnel**....................................................................................................................................................... 6

   2.3 **Irradiator specifications** .......................................................................................................................... 6

   2.4 **Radiation source specifications** ........................................................................................................... 7

   2.5 **Process specifications** .............................................................................................................................. 7

   2.6 **Dosimetry system** ...................................................................................................................................... 8

   2.7 **Validation**...................................................................................................................................................... 8

3. **Procedures** ................................................................................................................................................. 9

   3.1 **Dosimetry application** .............................................................................................................................. 9

   3.2 **Dose mapping**.............................................................................................................................................. 9

   3.3 **Routine dosimetry**................................................................................................................................... 10

   3.4 **Routine monitoring and control** ............................................................................................................ 10

   3.5 **Process interruptions** ............................................................................................................................ 11

   3.6 **Process loads** ............................................................................................................................................ 11

   3.7 **Equipment calibration** ................................................................................................................................ 11

   3.8 **Equipment maintenance** ....................................................................................................................... 11

4. **Verification of treatment** ................................................................................................................... 12

   4.1 **Determining efficacy of treatment** ....................................................................................................... 12

   4.2 **Treatment failure** .................................................................................................................................... 12

5. **Phytosanitary security measures** ................................................................................................... 13

   5.1 **Phytosanitary security** .......................................................................................................................... 13

6. **Documentation** ...................................................................................................................................... 14

   6.1 **Procedures**................................................................................................................................................. 14

   6.2 **Records**....................................................................................................................................................... 14

Glossary ............................................................................................................................................................ 16

References ....................................................................................................................................................... 19
1 Introduction

The objective of phytosanitary treatment is to prevent the introduction or spread of regulated pests. Effective phytosanitary treatments are critical to managing Australia’s plant biosecurity risks and safeguarding trade. The Australian treatment application standards ensure that treatments:

- are carried out in a consistent and effective manner
- reach the required efficacy every time they are applied.

This treatment application standard applies to the use of irradiation as a phytosanitary measure for imported product as well as exported and domestically traded product.

Irradiation is the treatment of product with ionising radiation by either gamma rays, electrons or x-rays. During irradiation, energy is transferred from a source of ionising radiation into the product. The amount of ionising energy absorbed is termed ‘absorbed dose’ or ‘dose’ and is measured in Grays (Gy). Its use as a phytosanitary treatment is pest specific. Unlike other treatments, irradiation is effective even if the pest remains alive as it prevents successful development of larvae and causes sterility in adults. Consequently the pest specific dosage is based on sterility rather than the rates required for mortality when using treatments such as fumigation and temperature based treatments.

Irradiation is used as an effective disinfestation treatment for a range of arthropod pests and is particularly effective on internal pests such as fruit flies.

The use of irradiation is subject to regulation by multiple agencies. In addition there are a number of international standards and best practice guides which govern how the treatment is applied. Building and safety requirements are regulated in Australia by the Australian Radiation Protection and Nuclear Safety Authority (ARPANSA), and Food Standards Australia and New Zealand (FSANZ) approves the use of irradiation on food. A list of current FSANZ approved products for irradiation are at www.foodstandards.gov.au. Product not approved for irradiation by FSANZ may be treated for export, to importing country specifications, but must not be sold within Australia for domestic human consumption.

Responsible certifying authorities must ensure, through audit or verification, that treatment facilities can demonstrate that they meet requirements to effectively deliver irradiation treatment. This may include registration, or approval arrangements by third parties.

1.1 Scope

This standard provides guidance on the effective application of irradiation as a phytosanitary measure for regulated pests on plant products for human consumption.

This standard is the baseline for the application of irradiation in trade with and within Australia. Additional requirements may apply to trade with some countries.

The following is out of scope:

- specific import requirements
- dose rates for specific pests
- operational instructions including requirements for facility registration, certification, approval of arrangements, etc.
- building and safety requirements
- work health and safety requirements
- food safety regulations.

The import requirements for trade with Australia can be found on the department’s website at www.agriculture.gov.au. The Biosecurity Import Conditions (BICON) database contains the requirements for imports to Australia and the Manual of Importing Country Requirements (MICoR) lists known conditions for exports from Australia. The specific State and Territory Department of Agriculture websites for domestic trade can be found on the relevant state websites.

The application of this standard does not exempt compliance with other current and applicable state and federal regulations.
2 Requirements

2.1 Treatment facility

2.1.1 Treatment facilities must be approved by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) or for off-shore irradiation facilities, the relevant equivalent body recognised by the International Atomic Energy Agency (IAEA).

2.1.2 The treatment facility must:

- be clean and pest free
- provide segregated areas (for example, physical barrier, fence, wall) for handling treated and non-treated products to prevent cross contamination and post treatment reinfestation
- have documented systems for all procedures related to the treatment and handling of product
- have documented systems for traceability (must allow for the identification of product at each step in their path through the facility).

2.2 Personnel

2.2.1 The irradiator operator must be able to competently demonstrate their capability to conduct irradiation treatments. Personnel performing tasks that could impact the effectiveness of the treatment must be competent on the basis of appropriate education, training, skills and experience.

2.3 Irradiator specifications

2.3.1 The irradiator must be capable of providing doses within the specified limits for phytosanitary treatments.

2.3.2 The radiation source must be either:

- gamma irradiation from Cobalt 60 (⁶⁰Co); or
- accelerated electrons (forming electron beams) with a maximum energy of 10MeV; or
- x-rays with a maximum energy of 5MeV.

2.3.3 The irradiator and it’s method of operation must be documented. The following must be described:

- the location of the irradiator within the facility
- means provided for the segregation of non-irradiated and irradiated product
- construction and operation of any associated conveyor system
- conveyor path(s) and the range of conveyor speed
- dimensions, materials and construction of the irradiator container(s)
- manner of operating and maintaining the irradiator and any associated conveyor system.
2.3.4 Software used to control and/or monitor the process must meet the design intentions (for example, as documented by the software provider).

2.4 Radiation source specifications

Gamma irradiators

2.4.1 The type of radiation and radiation source must be documented.

2.4.2 The following specification must be documented:

- type of radionuclide, its activity and source geometry
- means of indicating the position of the gamma source
- means of automatically returning the gamma source to the storage position and automatically ceasing conveyor movement if the process control timer or the conveyor system fails
- means of returning the gamma source to the storage position, and automatically ceasing conveyor movement or identifying affected products if the gamma source is not in its intended position.

Electron beam (eBeam) and x-ray irradiators

2.4.3 The energy of radiation must be documented.

2.4.4 The following specifications must be documented:

- the characteristics of the beam (electron or x-ray energy and, where applicable, average beam current, dose rate, scan width and scan uniformity)
- for x-ray irradiators, the dimensions, materials and construction of the x-ray converter
- the means of indicating that the beam and the conveyor system are operating
- the means of ceasing irradiation if any failure of the conveyor occurs which affects the dose and product requirements
- the means of ceasing conveyor movement or identifying affected product if any fault in the beam occurs.

2.5 Process specifications

2.5.1 For each product treated the process specifications must be documented. These specifications must include:

- description of packaged product, including dimensions, density and orientation of product within the package and acceptable variations
- loading configuration of product within the irradiation container
- irradiator operating conditions and limits (for example, beam characteristics, conveyor speed and source configuration)
- conveyor path(s) to be used
- minimum and maximum doses
- routine dosimeter monitoring position(s)
• relationship between the dose at the monitoring position(s) and the minimum and maximum doses.

2.5.2 If the product is to be given multiple exposures, process specifications must include any special requirements needed between exposures (for example, change of level within the carrier or time restrictions).

2.5.3 If the product has specific handling and storage conditions requirements (for example, temperature and humidity conditions) these must be documented in the process specifications.

2.6 Dosimetry system

2.6.1 Dosimeters (used in accordance with manufacturer’s specifications) must be appropriate for the treatment conditions (such as temperature and humidity in the treatment chamber).

2.6.2 Dosimeters must be capable of recording and measuring the entire range of dosages likely to be received by the product.

2.6.3 Dosimeters must be appropriate for the treatment, taking into consideration radiation type, effect of influence quantity, required level of uncertainty and required spatial resolution (see ISO ASTM 51261, ISO ASTM 51707:2005).

2.6.4 Dosimeters must be placed correctly, as per the process specifications, to ensure the specified doses are received by the product.

2.6.5 Dosimeters must be stored according to manufacturer’s specifications to negate the effects of variables such as light, temperature, humidity, storage time, and the type and timing of analyses required.

2.6.6 All components of the dosimetry process must be calibrated. The calibrations must be traceable to national or international standards.

2.7 Validation

Installation qualification (IQ)

2.7.1 Installation qualification must be performed when a new irradiation facility is being commissioned. It verifies that the irradiation facility meets its installation requirements. Validation of information generated during IQ is not usually performed by the responsible certifying authority under this standard.

2.7.2 Records must be kept of IQ.

Operational qualification (OQ)

2.7.3 Operational qualification must be performed when a new irradiation facility is commissioned. It verifies the irradiation facility operates to its design specifications. Validation of information generated during OQ is not usually performed by the responsible certifying authority under this standard.

2.7.4 Records must be kept of OQ.

Performance qualification (PQ)

2.7.5 Performance qualification must be performed when a new irradiation facility is commissioned. It verifies the irradiation facility will consistently deliver the required process to a given loading configuration within predetermined tolerances. Information generated during PQ must be reviewed by the responsible certifying authority and the outcome of the review must be recorded.

2.7.6 Dose mapping must occur during PQ.

2.7.7 Records must be kept of PQ.
3 Procedures

3.1 Dosimetry application

3.1.1 Dosimetry must be performed to ensure the specified doses are received by the product and maximum doses are not exceeded.

3.2 Dose mapping

3.2.1 Prior to the initial routine treatment, the product load configuration must be dose mapped to determine the lowest and highest dose absorbance points for each treatment configuration, taking into account absorbance variation arising from the product and its packaging.

3.2.2 Dose mapping studies are required:
   - to characterise the dose distribution throughout a process load
   - to determine the optimal load pattern, exposure time to source radiation, transit speed, ensuring that the treatment consistently delivers the required dose for each specific product/packaging configuration
   - to ensure that the prescribed efficacy for the target pest is achieved.

3.2.3 Dose mapping must be conducted at least three times per load configuration to determine the maximum and minimum doses for that product and load configuration.

3.2.4 The data obtained from dose mapping will determine the required number and placement of dosimeters during routine operations, including positioning of reference dosimeters.

3.2.5 The following product and packaging variation factors must be taken into account when dose mapping to ensure the ionising radiation penetrates to all parts of a three-dimensional load:
   - product density and composition
   - orientation, stacking and volume
   - package shape, composition and/or size.

3.2.6 Configurations used for phytosanitary treatments may require approval by the responsible certifying authority.

3.2.7 As seasonality may impact on whether sufficient product is available for dose mapping, other types of product which display the same characteristics of the target product such as density and packing configuration can be used. Where required, this must be approved by the responsible certifying authority.

3.2.8 Dose mapping records must include:
   - description of the irradiation container
   - product loading configuration
   - conveyor path
   - irradiator operating conditions
   - dosimeter locations and measurements
conclusions drawn.

3.2.9 Dose mapping must be repeated whenever changes are made, either in the facility, in its operation or to the loading configuration including to the product, packaging or arrangement of product within the packaging.

**Gamma irradiators**

3.2.10 The relationship between the source activity, timer setting, conveyor speed and dose must be established and documented for each loading configuration taking into account uncertainties and source decay.

3.2.11 The effect of dose distribution when product of different densities are present in the gamma irradiator shall be determined to define products that can be processed together.

3.2.12 Dose mapping for incomplete (partially filled) process loads is required to determine if the absorbed dose distribution is significantly different from the routine load and to adjust the treatment accordingly.

3.2.13 Dose mapping for the first and last process loads is required to determine if the absorbed dose distribution is significantly different from the routine load and to adjust the treatment accordingly.

**Electron beam and x-ray irradiators**

3.2.14 The relationship between the beam characteristics, the conveyor speed and the dose must be established for each loading configuration taking into account uncertainties.

*Note*: Different types of dosimeters can be used for dose mapping and routine dosimetry. For phytosanitary applications reference should be made to ATSM F1355-06.

3.3 **Routine dosimetry**

3.3.1 Dosimeter(s) must be placed in the process load at the predetermined maximum and minimum dose positions, or at a qualified reference dose location.

3.3.2 If the locations of the dose extremes identified during the dose mapping procedure are not readily accessible during routine processing, alternative positions may be used for routine dose monitoring. The relationships between the doses at these alternative reference positions and the maximum and minimum doses shall be reproducible, established and documented.

3.3.3 The frequency of dosimeter placement in the process load should be sufficient to verify the process is in control. For example, a placement frequency ensuring there is at least one dosimeter in the irradiator at any given moment, with at least one dosimeter on the first and last irradiation containers of each process load. The frequency and its rationale must be documented.

3.4 **Routine monitoring and control**

3.4.1 Prior to the irradiation process, any specific periodic tests, calibrations, maintenance tasks and necessary requalification should be performed and outcomes recorded.

3.4.2 Procedures for product handling and maintaining product integrity before, during and after irradiation must be documented.

3.4.3 Process parameters (for example, irradiation time, conveyor speed, product loading configuration) must be set, controlled, monitored and documented, taking into account uncertainty in routine dosimetry, to ensure that the product in each process load is processed within specifications.
3.4.4 If process parameters deviate outside prescribed processing limits appropriate actions must be taken. The responsible certifying authority will determine the reporting requirements for deviations outside prescribed processing limits.

3.5 Process interruptions

3.5.1 If a process interruption occurs it must be recorded and appropriate action must be taken. The responsible certifying authority will determine the reporting requirements for process interruptions.

3.6 Process loads

3.6.1 Product must be loaded in the product loading configuration according to the process specification. Products must be presented for processing in the same configuration used for dose mapping.

3.7 Equipment calibration

3.7.1 Documented procedures must be established for implementing and recording calibration and control systems.

3.7.2 All systems should be periodically checked to ensure that they are functioning according to specifications. The calibrations must be traceable to national or international standards.

3.7.3 Instrumentation used to control, indicate or record the irradiation process must be recalibrated at intervals determined by the manufacturer’s instructions.

3.7.4 Following any modification or servicing of the instruments they must be recalibrated.

3.8 Equipment maintenance

3.8.1 Documented procedures must be established for all equipment maintenance. All maintenance undertaken must be documented.

3.8.2 Procedures and records must be reviewed at least annually. The results of the review must be documented.

3.8.3 Equipment must not be used to treat product until all specified maintenance tasks have been satisfactorily completed and recorded.
4 Verification of treatment

4.1 Determining efficacy of treatment

4.1.1 The efficacy of the treatment must be verified by dosimetry which confirms the treatment is within the treatment parameters.

4.1.2 Documented systems must be established for reading the dosimeters after irradiation and determining a treatment result. Procedures must take into account the uncertainties of the measurement system.

4.1.3 Immediately following each treatment, the reference dosimeter(s) must be collected by the irradiator operator and analysed to determine what dose has been applied to the product.

4.1.4 Responsible certifying authorities will determine the frequency of auditing of the treatment facility.

Note: Radiation sensitive indicators cannot be used as proof of satisfactory radiation processing or as the sole means of differentiating irradiated products from non-irradiated products.

4.2 Treatment failure

4.2.1 The treatment is deemed to have failed if:

- the minimum dose is not achieved
- the maximum dose is exceeded.

4.2.2 Documented systems must be established for the management of failed treatments including:

- control of product
- procedures for identification of the cause of the failure
- identification of corrective actions
- records of corrections or preventative actions taken.

4.2.3 The responsible certifying authority may require notification when treatments fail.

Note: The phytosanitary dose rates are not always fatal for the target pest, the detection of live insects in irradiated product does not indicate a treatment failure.
5 Phytosanitary security measures

5.0.1 Treatment facilities must have a phytosanitary security system in place and the identity and integrity of each consignment must be maintained.

5.1 Phytosanitary security

5.1.1 Phytosanitary security must be maintained during and after treatment. The responsible certifying body may determine specific phytosanitary security measures. The methods of securing product against pests are:

- using a secure area with product segregation and traceability
- using secure packaging
- a combination of both

5.1.2 Procedures must be in place to identify and segregate treated product and allow for movement without the risk of it mixing with any other product.

5.1.3 The procedures must cover all practices that pose a phytosanitary security risk to the treated goods including receivals, storage and dispatch. The procedures must enable consignments to be linked to a specific treatment and be traced back to a packhouse and grower, if required.

5.1.4 Treated product must be kept in secure conditions to prevent infestation by regulated pests when stored at the treatment facility.

5.1.5 The responsible certifying body will determine when treated product is required to be kept in secure conditions to prevent infestation by regulated pests when transported from the treatment facility.

5.1.6 After treatment, all product must be identified as ‘treated’ for identification and traceability purposes.
6 Documentation

6.1 Procedures

6.1.1 The following documents must be kept and made available to the responsible certifying authority when requested:

- treatment procedures
- phytosanitary security procedures
- maintenance procedures
- dosimetry procedures

6.1.2 Procedures must reflect current practices and be compliant with this standard.

6.2 Records

6.2.1 The following records must be kept and made available to the responsible certifying authority when requested:

- all records pertaining to irradiation treatment including:
  - treatment certificates
  - dose mapping
  - maintenance records
- internal verification records
- any additional records required by the responsible certifying authority or importing authority.

6.2.2 Treatment certificates must accompany all product treated by the irradiator operator. All details must be:

- legible
- free from erasures and non-certified alterations
- in English.

6.2.3 Treatment certificates must be signed, dated and contain the following details:

- description of the commodities including quantity and distinguishing numbers such as irradiation lot number, specification number or a reference to load configuration
- radiation source, and energy level for electron beam and x-ray
- date of treatment
- name of treatment facility
- minimum and maximum doses (specified and actual)
- consignment owner
- any deviation from the treatment specification.
6.2.4 All records must be retained from a minimum of two years, unless otherwise specified by responsible certifying authority, importing authority or other regulations.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbed dose</td>
<td>Quantity of radiating energy absorbed per unit of mass of a specified target. [Note, for the purposes of this Standard, the term dose is used to mean absorbed dose and the unit of absorbed dose is the gray (Gy) where 1 Gy is equivalent to the absorption of 1 joule per kilogram]. [ISO 11137-1:2006]</td>
</tr>
<tr>
<td>Calibration</td>
<td>Set of operations that establish, under specified conditions, the relationship between values of a quantity indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. [ISO 11137-1:2006]</td>
</tr>
<tr>
<td>Correction</td>
<td>Action to eliminate a detected non-conformity. A correction can be made in conjunction with a corrective action. [ISO 9000:2005]</td>
</tr>
<tr>
<td>Corrective action</td>
<td>Action to eliminate the cause of a non-conformity or other undesirable situation. There can be more than one cause of non-conformity. Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence. (There is a distinction between correction and corrective action). [ISO 9000:2005]</td>
</tr>
<tr>
<td>Dose</td>
<td>The term refers to absorbed dose.</td>
</tr>
<tr>
<td>Dose distribution</td>
<td>Spatial variation of absorbed dose throughout the process load, integrated over a complete treatment. The extreme values are the maximum dose (Dmax) and the minimum dose (Dmin).</td>
</tr>
<tr>
<td>Dose mapping</td>
<td>Measurement of dose distribution and variability in material irradiated under defined conditions. [ISO 11137-1:2006]</td>
</tr>
<tr>
<td>Dosimeter</td>
<td>A device that, when irradiated, exhibits a quantifiable change in some property of the device which can be related to absorbed dose in a given material using appropriate analytical instrumentation and techniques. [ISPM 18 2003]</td>
</tr>
<tr>
<td>Dosimetry</td>
<td>Measurement of absorbed dose by the use of dosimeters. [ISO 11137-1:2006]</td>
</tr>
<tr>
<td>Dosimetry system</td>
<td>The procedures and interrelated elements used for determining absorbed dose, including dosimeters, instruments and associated reference standards. [ISO 11137-3:2006]</td>
</tr>
</tbody>
</table>
Import requirements
Specific phytosanitary measures prescribed by an importing authority, concerning consignments moving into that territory.

Installation qualification (IQ)
Obtaining and documenting evidence that equipment has been provided and installed in accordance with its specification. [ISO 11137-1:2006]

Irradiation
Treatment with any type of ionising radiation. [ISPM 5]

Irradiation container
Holder in which product is transported through the irradiator. The holder can be a carrier, cart, tray, product carton, pallet, tote or other container. [ISO 11137-1:2006]

Irradiator
The assembly of equipment and its housing where product is exposed to ionizing radiation. The irradiator provides for safe and reliable radiation processing and includes the source of radiation and associated mechanisms together with the conveyor, safety devices and biological shield.

Irradiator operator
Organization or body responsible for irradiating the product. [ISO 11137-1:2006]

Loading configuration
Defined arrangement of product placed in or on the irradiation container.

Maximum adsorbed dose (Dmax)
The localised maximum adsorbed dose within a process load. [ISPM 18 2003]

Minimum absorbed dose (Dmin)
The localised minimum adsorbed dose within a process load. [ISPM 18 2003]

Operational qualification (OQ)
Obtaining and documenting evidence that installed equipment operates within predetermined limits when used in accordance with its operational procedures. [ISO 11137-1:2006]

Performance qualification (PQ)
Obtaining and documenting evidence that the equipment, as installed and operated in accordance with operational procedures, consistently performs in accordance with predetermined criteria and thereby yields product meeting its specification. [ISO 11137-1:2006]

Preventative action
Action intended to eliminate the cause of a potential non-conformity or other undesirable potential situation. There can be more than one cause for a potential non-conformity. Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent reoccurrence. [ISO 9000:2005]

Process
The combination of actions and parameters that result in a product being exposed to the correct dose of irradiation within set minimum and maximum dose. These include pre, during and post treatment actions such as loading.
configuration, conveyor speed, source position or energy level and dosimetry.

Process interruption  Intentional or unintentional stoppage that acts to prevent the irradiation process from proceeding continuously. [ISO 11137-1:2006]

Process load  A volume of product with a specified loading configuration and treated as a single entity. [ISPM 5]

Process parameter  Specified value for a process variable. The specification for a process includes the process parameters and their tolerances. [ISO 11137-1:2006]

Process variable  A parameter within an irradiation process that can be altered in magnitude and by doing so changes or alters the process effectiveness. For example conveyor speed and source position.

Radiation-sensitive indicator  Material which may be affixed to, or printed on, the process load and which undergoes a visual change when exposed to ionizing radiation. These indicators do not provide a quantitative measure of dose and may not work or be unreliable at low doses (for example in the dose range employed for phytosanitary treatments). [Adapted from ISO/ASTM 51539:2005]

Radiation source  Device that emits ionizing radiation.

Radionuclide  Radioactive isotope of an element (such as cobalt-60 or cesium-137).

Product  The plant product to be treated.

Responsible certifying authority  The National Plant Protection Organisation (NPPO) and State/Territory Departments of Agriculture and potentially any other party approved under the authority of the NPPO or State/Territory Departments of Agriculture.

Treatment  Official procedure for the killing, inactivation or removal of pests, or for rendering pests infertile or for devitalization. [FAO, 1990, revised FAO, 1995; ISPM 15, 2002; ISPM 18 2003; ICPM, 2005]

Treatment facility  Any site where irradiation takes place.
References


ASTM F1355-06. Standard guide for irradiation of fresh agricultural produce as a phytosanitary treatment.

ISO 14470. 2011. Requirements for the development, validation and routine control of the process of irradiation using ionising radiation for the treatment of food.


