



Insecticide treatment methodology

Version 1.0



© Commonwealth of Australia 2021

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) 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@awe.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: Department of Agriculture, Water and the Environment 2021, *Insecticide spray treatment methodology*, Department of Agriculture, Water and the Environment, Canberra, April. CC BY 4.0.

ISBN 978-1-76003-392-7

This publication is available at

<https://www.agriculture.gov.au/import/arrival/treatments/treatments-fumigants>

Department of Agriculture, Water and the Environment

GPO Box 858 Canberra ACT 2601

Telephone 1800 900 090

Web awe.gov.au

Disclaimer

The Australian Government acting through the Department of Agriculture, Water and the Environment has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Water and the Environment, 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.

Purpose

This methodology sets out the minimum requirements for treatment providers performing insecticide spray treatments on commodities, containers and/or associated packaging suited to such treatments for Quarantine and Pre-shipment (QPS) purposes. This methodology is the basis for compliance auditing of treatment providers to monitor their performance of effective treatments with insecticides.

Scope

This document applies to commercial and government treatment providers performing QPS insecticide treatments for countries that have adopted a specific insecticide treatment schedule.

General

Best practice application of insecticide is achieved through a practical combination of all procedures required during a treatment to ensure that:

- the target pest is managed
- the people conducting the treatment remain safe and are not harmed
- all people in the area around the treatment area remain safe and are not harmed
- the environment is not harmed
- the goods, or product, or equipment being treated is not damaged or adversely affected.

Treatment providers performing treatments in accordance with these requirements must have the equipment, facilities, personnel and administrative procedures necessary to ensure that all relevant treatments comply with these requirements.

Importing countries have the right to impose more stringent treatment conditions to address their individual biosecurity risks. In such cases, those additional conditions take precedence over the requirements of this methodology and must be complied with to the satisfaction of the relevant authority of the importing country.

Countries receiving treatment certification through this system expect the treatment has been undertaken in accordance with this methodology. Treatment providers found to be wilfully and consistently not complying with the requirements of this methodology and/or other specified treatment conditions will have their registration status changed to 'unacceptable' until they can demonstrate satisfactory compliance.

How to use this document

This document outlines the minimum set of requirements for performing insecticide spray treatments. Many insecticides will have additional requirements stipulated by the chemical manufacturer on the product label. Additionally, importing countries may set additional requirements for the application of insecticide for certain products or pathways.

Both the manufacturer's instructions, specific import conditions and biosecurity directions, for the use and application of insecticide must be followed. Where those requirements contradict conditions in this methodology, follow the requirement outlined by the manufacturer or in import conditions.

It is important for treatment providers and compliance auditors to understand the purpose of the requirements, the outcomes they are intended to achieve and the circumstances in which they apply.

The technical terms used in this methodology are defined in the glossary at the back of the document. For all terms not defined in the glossary, refer to the definition used by the Macquarie Dictionary.

Contents

Purpose	3
Scope	3
General	3
How to use this document	3
1 Prior to treatment	6
1.1 Target surface(s) of the treatment	6
1.2 Target suitability.....	6
1.3 Site suitability.....	6
2 Safety	6
2.1 Risk assessment.....	6
2.2 Warning signs.....	7
2.3 Personal Protective Equipment.....	7
3 Calculating the dose	7
3.1 Insecticide product.....	7
3.2 Calculating the total target surface area.....	7
3.3 Dose calculation.....	7
4 Mixing	8
4.1 Mixing the spray solution	8
4.2 Spray tank agitation.....	8
5 Conducting the treatment	8
5.1 Equipment.....	8
5.2 Calibration	9
5.3 Applying the treatment	9
5.4 Post treatment.....	10
6 Documentation	10
6.1 Record of Insecticide Treatment.....	10
6.2 Insecticide Treatment Certificate.....	11
6.3 Record management.....	12

1 Prior to treatment

1.1 Target surface(s) of the treatment

- 1.1.1 The insecticide treatment provider must identify the target of the insecticide treatment.
- 1.1.2 The target of the insecticide treatment must match the surface, area or goods specified in the treatment schedule.

1.2 Target suitability

- 1.2.1 The insecticide treatment provider must determine if the target is suitable for treatment with insecticide.
- 1.2.2 All target surfaces must be pressure washed to ensure they are free from dirt and debris. High pressure water must be applied directly into all cracks, joints, and crevasses in the target surface.
- 1.2.3 All target surfaces must be completely dry prior to applying the insecticide solution.
- 1.2.4 Remedial action must be taken, or an alternative acceptable treatment method used, if the consignment is not suitable for treatment.

1.3 Site suitability

- 1.3.1 The treatment application site must:
 - have adequate space to establish a risk area around the enclosure
 - be well ventilated
 - be flat and even
 - have power available, either mains or generator
 - have potable water available.
- 1.3.2 Where the target of treatment is a sea container, the sea container must be placed on a container stand to allow access to all target surfaces for cleaning and treatment application.
- 1.3.3 Container stands must comply with all relevant safety standards and be safe and fit for purpose.

2 Safety

2.1 Risk assessment

- 2.1.1 Where the label specifies directions for safe use and handling of the product, those directions must be followed.
- 2.1.2 Before commencing any insecticide application, a risk assessment must be carried out to determine if any hazards are present and evaluate the potential consequences to:
 - treatment application personnel

- people in the area around the treatment
- occupants of surrounding buildings and premises
- the surrounding environment.

2.1.3 Appropriate control measures must be in place to address the hazards identified.

2.1.4 The risks must be reviewed as needed to respond to changing circumstances and the control measures must be adjusted accordingly.

2.1.5 The insecticide treatment provider is responsible for the safe conduct of the treatment.

2.2 Warning signs

2.2.1 Warning signs indicating that insecticide mixing and spraying is in progress must be placed around the spray solution preparation and application area. They must:

- be large enough to be visible from a reasonable distance
- be visible from all angles of approach
- display easily understood symbols indicating danger and/or chemical spraying in progress
- be in a language or languages appropriate to the location.

2.3 Personal Protective Equipment

2.3.1 Where the label specifies requirements for wearing or using PPE, those directions must be followed.

3 Calculating the dose

3.1 Insecticide product

3.1.1 The insecticide product used must contain the active constituent specified in the treatment schedule.

3.1.2 The insecticide product must not have expired or have been made unsuitable due to incorrect storage (as stipulated on the product label) or other factor.

3.2 Calculating the total target surface area

3.2.1 The insecticide treatment provider must determine the total surface area required to be treated. Allowances must be made for all ridges, cracks, joints, and crevasses when determining the surface area.

3.3 Dose calculation

3.3.1 The insecticide treatment must be conducted at the rate specified in the treatment schedule.

- 3.3.2 The volume of concentrate used must be calculated by dividing the required spray concentration by the concentration of active constituent in the product, and then multiplying by the volume of spray solution required. The formula is:

Volume of concentrate required (mL) = spray solution concentration required (%) / concentration of active constituent in product (%) x volume of spray solution required (mL)

- 3.3.3 Where the concentration of active constituent in product is expressed in g/L, this can be converted to a percentage by dividing by 10. The formula for this is:

Concentration of active constituent in product (%) = concentration of active constituent in product (g/L) / 10

Note: A concentration of 10g/L of active constituent in product is equivalent to 1%.

4 Mixing

4.1 Mixing the spray solution

- 4.1.1 Where the label specifies a process for mixing the spray solution, that process must be followed.
- 4.1.2 Where the label does not specify a process for mixing the spray solution, first the spray tank must be filled with half the required volume of water, then the required amount of concentrate must be added, followed by the remaining water.
- 4.1.3 The spray solution must be applied to the target surface within 2 hours of being mixed.

4.2 Spray tank agitation

- 4.2.1 The spray solution must be agitated before application, and agitated at least once every 15 minutes during application, to ensure thorough mixing. The spray solution must not be allowed to settle in the spray tank.

5 Conducting the treatment

5.1 Equipment

- 5.1.1 The equipment used to apply the spray solution must be fit for purpose and in good working order.
- 5.1.2 The spray solution must be applied with a mechanical sprayer equipped with a lance of at least 1 metre.
- 5.1.3 The equipment used to apply the spray solution must be capable of producing the spray quality specified in the treatment schedule.

5.2 Calibration

5.2.1 The equipment used to apply the spray solution must be calibrated in the 7 days prior to treatment.

5.2.2 Calibration and treatment application must be undertaken by the same person.

5.2.3 The equipment used to apply the spray solution must be calibrated to provide the application rate as specified in the treatment schedule.

5.2.4 To calculate the application rate of the sprayer, spray a set area (m²) with water and measure the volume (L). The formula is:

$$\text{Application rate (L/m}^2\text{)} = \text{volume of water sprayed (L)} / \text{area sprayed (m}^2\text{)}$$

Note: To achieve the application rate as specified in the treatment schedule the speed of application may need to be adjusted; or the nozzle tip may need to be replaced.

5.2.5 A Record of Calibration must be completed for every calibration. An example Record of Calibration is provided at [Appendix 3: Example record of calibration](#).

5.2.6 The following information must be recorded on a Record of Calibration:

- location—the site address where the calibration was performed
- the time and date the calibration was conducted
- the name and signature of the calibrating person
- total calibration surface area
- time taken to apply spray to the point of run-off
- volume of water used for calibration
- calculated application rate
- identification of nozzle used
- pressure calibration spray was applied at

5.2.7 All sections of the Record of Calibration must be completed accurately.

5.2.8 The Record of Calibration must be completed at the same time and location as the insecticide treatment.

5.3 Applying the treatment

5.3.1 Where label specifies directions for applying the spray solution, those directions must be followed.

5.3.2 The spray solution must be applied to the point of run-off to all flat, non-porous target surfaces. The insecticide spray must not be applied past the point of droplets coalescing and running off from the surface.

5.3.3 The spray solution must be applied to saturate all cracks, joints or crevices in the target surface area.

5.3.4 The full treatment dose must be applied to all target surfaces.

- 5.3.5 The spray solution must be applied in the spray quality specified in the treatment schedule.

5.4 Post treatment

- 5.4.1 All treatment surfaces must remain dry for 3 hours after the treatment application. If any water, including rain, contacts any treatment surface in the 3 hours after treatment, the treatment has failed.

6 Documentation

6.1 Record of Insecticide Treatment

- 6.1.1 A Record of Insecticide Treatment must be completed for all successful and failed insecticide treatments. An example Record of Insecticide is provided at [Appendix 1: Example record of insecticide treatment](#).
- 6.1.2 All target surfaces treated with a single spray solution are considered part of the same treatment. Each spray solution mixture must be recorded on a separate Record of Insecticide Treatment.
- 6.1.3 The following information must be recorded in the Record of Insecticide to demonstrate that the insecticide treatment complied with requirements:
- job identification
 - client or customer name
 - location—the site address where the treatment was performed
 - consignment identification/link – container number(s) or other means to clearly identify the consignment
 - where the target is a sea container, the manufacturer’s serial number (located on the Safety Approval (CSC) plate)
 - description of the consignment where known
 - description of the target surface(s) for treatment
 - total surface area to be treated
 - name of insecticide product and batch number or manufacturing date
 - name and concentration of active constituent in insecticide product
 - specified active constituent
 - specified treatment rate
 - actual treatment rate applied
 - volume of insecticide product applied
 - make and model of nozzle used and operating pressure
 - volume of spray solution remaining in the spray tank after treatment

- an indication of whether it rained in the 3 hours following treatment
- time and date pressure washing was undertaken
- time and date the spray solution was prepared
- time and date the spray solution was applied
- the name and signature of the insecticide treatment provider-in-charge.

6.1.4 All sections of the Record of Insecticide Treatment must be completed accurately.

6.1.5 The Record of Insecticide Treatment must be completed at the same time and location as the insecticide treatment.

6.2 Insecticide Treatment Certificate

6.2.1 An Insecticide Treatment Certificate must be issued by a suitably accredited person once they are satisfied that the treatment has been performed in accordance with the requirements of this methodology and the importing country requirements. An example Insecticide Treatment Certificate is provided at [Appendix 2: Example insecticide treatment certificate](#).

6.2.2 The following information must be recorded on an Insecticide Treatment Certificate to demonstrate that the insecticide treatment complied with requirements:

- treatment provider's letterhead including name and physical address
- where the treatment provider has a registration number, it must be provided
- certificate number
- description of the target surface of the treatment– including total area
- consignment identification/link – container number(s), bill of lading, or other means to clearly identify the consignment
- where the target is a sea container, the container number and size must be included
- country of origin, country of destination, and port of loading
- name and address of exporter
- name and address of importer
- name of insecticide product and active constituent
- treatment rate required
- spray quality required
- treatment rate applied
- spray quality applied
- total treatment surface area
- date the treatment was completed
- location—the site address where the treatment was performed

- a declaration that the information on the certificate is true, complete, and accurate, and that the treatment has been applied in accordance with the Insecticide Treatment Methodology
- the name and signature of the insecticide treatment provider-in-charge.
- the date the Insecticide Treatment Certificate was issued

6.2.3 All sections of the Insecticide Treatment Certificate must be completed accurately.

6.2.4 The Insecticide Treatment Certificate must accompany the consignment to state that it has been effectively treated for QPS purposes.

6.3 Record management

6.3.1 Copies of the Record of Calibration, Record of Insecticide Treatment, Insecticide Treatment Certificate, product labels and purchasing records must be maintained for a minimum of two years.

Appendix 1: Example record of insecticide treatment

Record of Insecticide Treatment

Job details					
Job identification	Location of treatment		Customer name	Any rainfall in the 3 hours following treatment? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Treatment schedule			Treatment target		
Specified active constituent	Specified spray quality _____ microns to _____ microns		Description of target surface(s) <input type="checkbox"/> internal & external walls & door up to 1m <input type="checkbox"/> internal & external underside floor <input type="checkbox"/> door seals		
Specified treatment rate _____ litre(s), minimum solution concentration _____%, per _____ m ²			Total target treatment surface area _____ m ²	Description of consignment (if known)	
Spray solution applied					
Product name	Batch no/manufacture date	Active constituent	Product concentration _____ % or _____ g/L	Spray solution mixed _____ time _____ date	Nozzle make and model
Volume of concentrate used _____ mL	Volume of water used _____ L	Percentage active constituent in solution _____ %	Spray quality applied _____ microns to _____ microns		Pressure solution applied _____ PSI/kPa
Treatment application details					
Container number	Manufacturer's serial number	Time washing complete	Time spray application complete	Container size	Treatment surface area
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
				40' <input type="checkbox"/> 20' <input type="checkbox"/> other <input type="checkbox"/> _____	m ²
		Date: _____	Date: _____		Total: _____ m ²
Calibration		Spray solution remaining		Insecticide treatment provider-in-charge	
Date of last calibration	Volume of spray solution remaining in spray tank _____ L		Name	Signature	

Appendix 2: Example insecticide treatment certificate

COMPANY LETTERHEAD
(Including physical address and contact details)

INSECTICIDE TREATMENT CERTIFICATE

Certificate Number:

Registration Number:

CONSIGNMENT DETAILS

Target of treatment Commodity Packaging Empty container

Target surface(s) description: internal & external walls & door up to 1m internal & external underside floor door seals other:..... Total area:m²

Consignment link or container number(s) and size:

Country of origin:..... Port of loading:..... Country of destination:.....

Name and address of exporter:	Name and address of importer:
--	--

INSECTICIDE DETAILS

Insecticide(s) active constituent:	Concentration of active constituent:	Product name(s):
1.....	1..... g/L or %	1.....
2.....	2..... g/L or %	2.....

TREATMENT DETAILS

Specified treatment rate: Spray solution: L Minimum concentration:..... % Per m ² Spray quality: microns to microns	Treatment applied: Concentrate: mL Spray solution: L Concentration: % Total target area: m ² Dosage per 20m ² :L/20m ² Spray quality: microns to microns
Date of treatment:	Location of treatment:

DECLARATION

I declare that all information on this certificate is true, complete, and accurate, and that the treatment has been applied in accordance with the Insecticide treatment methodology.

Signature: 	Name: Date:	<i>Company stamp</i>
-------------------------	--------------------------------------	----------------------

Appendix 3: Example record of calibration

Record of Calibration

Calibration details	
Date of calibration	Location of calibration
Calibration application	
Calibration surface description 40' container <input type="checkbox"/> 20' container <input type="checkbox"/> other <input type="checkbox"/>	Total calibration surface area m ²
Pressure solution applied PSI/kPa	Spray quality applied microns to microns
Nozzle make and model	Time calibration undertaken
Time taken to apply dose Minutes Seconds	Volume of water used mL
Calculated application rate	
Target application rate L per m ²	Calculated rate applied L per m ²
Adjustments made If adjustments made, calibration restarted <input type="checkbox"/> yes	
Insecticide provider-in-charge	
Name	Signature

Glossary

Term	Definition
Active constituent	Refers to the component (or components) of a chemical product that is primarily responsible for giving the product its insecticidal effect. A chemical product may contain more than one active constituent.
Concentrate or insecticide concentrate	Refers to the insecticide product straight from the manufacturer's packaging before it is mixed with water.
Consignment	Refers collectively to the goods, any packing materials used and the mode of transport such as a sea container.
CSC Plate	Refers to the plate fastened to the sea container indicating the container satisfies the requirements of the International Convention for Safe Containers (CSC). Usually, the plate is rivetted to the outside of the left door.
Goods	Refers to the items that are being exported or imported.
Insecticide treatment provider	Refers to the company or individual applying the insecticide treatment to the target surface.
Mechanical sprayer	Refers to the hand operated spray equipment used to apply the spray. Includes backpack or knapsack sprayers and truck-mounted sprayers.
Pressure wash	Refers to water applied under pressure to a surface for the purpose of cleaning or removing contaminants.
Product or insecticide product	Refers to the specific chemical or product being used for the insecticide treatment. Usually referred to by a product or manufacturer's name.
Product label	Refers to the technical information about a chemical product in the form of printed material provided by the manufacturer or its agent, including the label, flyers, handouts, leaflets and brochures.
Quarantine and Pre-shipment (QPS)	<p>Quarantine and Pre-shipment Pre-shipment</p> <ul style="list-style-type: none"> a. Any treatments applied within 21 days prior to export to meet: <ul style="list-style-type: none"> i. The official requirements of the importing country; or ii. The existing official requirements of the exporting country - being the official requirement performed or authorised by a national plant, animal, environmental, health, or stored product authority; but b. Does not include quarantine applications <p>Quarantine</p> <p>Any treatments to prevent the introduction, establishment and/or spread of quarantine pests (including diseases), or to ensure their official control, where:</p> <ul style="list-style-type: none"> a. Official control is that performed by, or authorised by, a national plant, animal or environmental protection or health authority. b. Quarantine pests are pests of potential importance to the areas endangered thereby and not yet present there, or present but not widely distributed and being officially controlled.
Spray quality	<p>Describes the droplet size distribution in the spray produced by a nozzle. The spray quality produced by any nozzle system depends on the type of nozzle, the orifice size, spray angle and operating pressure.</p> <p>Can be expressed in both quality terms (course, fine, very fine etc) or specific measurements (usually in microns).</p>
Spray solution	Refers to mixture of insecticide concentrate and water. The mixture that is actually applied to the target surface.

Term	Definition
Spray tank	Refers to the reservoir or container used to hold the spray solution for application.
Target of treatment or target surface(s) of treatment	Refers to the specific areas or locations that are required to be treated. These can include the goods, packaging, areas of a sea container etc. The target is usually specified in the treatment schedule.
Treatment schedule	<p>Refers to the critical parameters of a treatment which need to be met to achieve the intended outcome (i.e. the killing, inactivation or removal of pests, or rendering pests infertile, or devitalization) at a stated efficacy.</p> <p>Usually expressed in importing country requirements or conditions, or other conditions that apply to the way the treatment must be applied. For insecticide treatments, the schedule will usually include a description of the target surfaces and rate of treatment expressed as X amount of spray solution, containing Y amount of active constituent over Z surface area. It may also include additional treatment application requirements over and above those specified in this methodology.</p>