



Treatment Requirement

Approved Biosecurity Treatments

MPI-ABTRT

22 July 2019

TITLE


Treatment Requirement: Approved Biosecurity Treatments

COMMENCEMENT

This Treatment Requirement is effective from 22 July 2019

ISSUING BODY

This Treatment Requirement is issued by the Ministry for Primary Industries.



Dated at Wellington this 22nd day of July 2019

Peter Thomson
Director, Plants and Pathways
Ministry for Primary Industries
(acting under delegated authority of the Director-General)

Contact for further information
Ministry for Primary Industries
Biosecurity New Zealand
Facilities and Pathways
PO Box 2526
Wellington 6140

Email: standards@mpi.govt.nz

Contents	Page
Introduction	3
Purpose	3
Background	3
Who should read this Treatment Requirement?	3
Why is this important?	3
Document History	3
Other information	3
Part 1: Treatments	5
1.1 Live Animals as Hitchhikers and Illegal Imports	5
1.2 Inedible Animal Products	7
1.3 Edible Animal Products	10
1.4 Equipment used with Animals or Water	11
1.5 Forest Produce	14
1.6 Stored Products	18
1.7 Plant Products	21
1.8 Nursery Stock	22
1.9 Fresh Flowers and Foliage	27
1.10 Fresh Fruit and Vegetables	30
1.11 Seeds	33
1.12 Vehicles, Machinery, Containers, Parts, Tyres, Equipment (not used with animals) etc.	38
1.13 Soil	43
1.14 Vessels or Floating Structures	44
1.15 Water	45
Appendix 1: Amendment Record and Implementation Schedule	48
Appendix 2: Definitions	52

Introduction

This introduction is not part of the Treatment Requirement, but is intended to indicate its general effect.

Purpose

When incorporated by reference into an import health standard or directed by an inspector this document specifies measures to be applied to risk goods requiring treatment prior to obtaining biosecurity clearance.

Background

Imported risk goods have the potential to introduce pests and unwanted organisms into New Zealand. The Biosecurity Act 1993 (the Act) prescribes requirements for the exclusion, eradication and effective managing of pests and unwanted organisms in New Zealand. Unwanted pests/organisms have the potential to cause harm to natural and physical resources and human health in New Zealand. The Ministry for Primary Industries (MPI) is responsible for enforcing the provisions of the Biosecurity Act 1993.

Who should read this Treatment Requirement?

All importers of goods to which an import health standard applies that incorporates by reference this treatment requirement or have had goods directed for treatment.

Why is this important?

Importers must ensure they comply with the relevant import health standard for importing goods. For goods to be cleared, importers may need to comply with directions for treatment. Failure to meet the requirements of the IHS or a direction may result in the goods being reshipped or destroyed.

Document History

Refer Appendix 1

Other information

If treatments are being applied in New Zealand, the treatment must be carried out by a treatment provider approved by MPI. The treatment provider may only apply treatments given in their scope of approval and some treatments may not be available at a particular location. Importers should check treatment availability prior to importing goods. A list of approved providers is available at: <http://mpi.govt.nz/importing/border-clearance/transitional-and-containment-facilities/treatment-suppliers/>

Importers are reminded that:

- a) They import contaminated goods into New Zealand at their own risk, goods may be reshipped or destroyed in some circumstances;
- b) If pre-clearance decontamination is required this is entirely at the importer's risk and expense in all respects;
- c) Specifically, if treatment is required this is a private arrangement between the treatment supplier and importer and not carried out on behalf of MPI;
- d) Whilst MPI will ensure that only suitably qualified treatment suppliers are available for use by the importer MPI accepts no responsibility whatsoever for any failure by the treatment supplier in its contract for treatment services with the importer.
- e) Pre-shipment treatments may differ and are listed in the relevant import health standard, see the search facility: <http://www.mpi.govt.nz/law-and-policy/requirements/import-health-standards/>

The measures are separated for convenience into commodity groups commonly imported into New Zealand and lists the approved treatment options. The rates or dosages, temperature ranges, exposure times needed and the source from which the treatment is obtained are specified for each treatment. A short code has been allocated to simplify reference to the specified treatment and these may be revised over time. Notes and comments are included and must be read in conjunction with the measure specified to ensure the success of the selected treatment.

For some treatments the pest may be sterilised rather than killed (e.g. irradiation) or it may take some time (hours or days) for the pest to die. Factors influencing this are the type of treatment, dose, temperature (before, during and after treatment), insect species and life stage.

Methyl bromide is only to be used for official treatments see: [Find out about official use of methyl bromide](#)

Any item awaiting treatment must be isolated and held securely to contain the biosecurity contamination or pests and be treated within the time specified on the Biosecurity Authority Clearance Certificate (BACC). If a direction is received to move an item to another facility for treatment then this must happen in a secure manner to contain the Biosecurity contamination or pest.

An importer may propose an alternative treatment for approval by MPI. Full details that prove equivalence of efficacy are to be provided to MPI before approval can be granted and treatment may commence. The International Plant Protection Convention ISPM 28 should be used as guidance when submitting a treatment for MPI approval: Costs involved in the evaluation process may be recovered and decisions on alternative chemicals and treatments may be subject to delay.

The importer of risk goods, including baggage, mail or personal effects that are treated before clearance must

- a) Pay the actual and reasonable costs of the treatment; and
- b) Bear the costs (if any) of packaging, storing, forwarding, and returning the goods before and after treatment.

It is the treatment provider's responsibility to ensure the goods are safe to access or handle after treatment. Treatment certificates will be verified by MPI before the goods treated will be given clearance.

These measures may be reviewed and amended at any time at the discretion of the chief technical officer (CTO). Treatment providers must ensure that the latest version of this schedule is being used at all times (date at the bottom of the page).

Part 1: Treatments

1.1 Live Animals as Hitchhikers and Illegal Imports

Commodity/Product	Requirements to be met	Treatment Procedure to follow
<p>Small Animals; includes Fish, Amphibians, Reptiles and small Mammals</p> <p>See Note 1 below re CITES</p>	<p>Euthanasia as directed. Also refer below for treatment with carbon monoxide.</p> <p>[Unless stated otherwise, the processes here are to be undertaken or supervised by an Inspector.]</p>	<p>The euthanasia of small animals that are found as hitchhiker pests at the border is not a straightforward issue to deal with. Despite their small size these animals may be wild and therefore dangerous, scared, injured or fractious. Other species may have quills, scales or spines that are dangerous or poisonous. The most humane methods may endanger the handler or person who is carrying out the euthanasia because of the need to get close enough to handle the animal and deliver the method of euthanasia. In addition the health status of the animal is usually unknown and therefore extreme care must be taken when dispatching the animal. Nevertheless, euthanasia must be carried out as painlessly and quickly as possible. A number of different methods of euthanasia are available but their use will depend on the type and nature of the animal and the situation. The following is recommended:</p> <ol style="list-style-type: none"> 1. The hitchhiker animal should be secured in a container such as a bag, cage, sack or box etc which can be held in safe custody and which will aid the process of euthanasia. 2. The preferred option is for a MPI veterinarian to carry out the euthanasia process. A MPI veterinarian may choose other acceptable euthanasia options to those mentioned here, for example injection with suitable barbiturates. 3. In the absence of a MPI veterinarian, any other registered MPI-approved veterinarian may undertake the euthanasia process provided and the euthanasia is performed in the presence of an Inspector. In these situations, the Inspector may have to retrieve the dead animal for incineration. 4. If a veterinarian is not available, an Inspector is to undertake the euthanasia process as mentioned below.

Commodity/Product	Requirement	Short Code	Treatment Procedure to follow	Comments
Amphibians (e.g. frogs), Reptiles (e.g. lizards) and Fish	Euthanasia or LAT3 or LAT4	LAT1	Place in a refrigerator for a period of 5 hr to induce torpor then in a freezer for 24 hr.	Note:1 As hitchhiker or illegal imports but check with DOC for endangered species first e.g. CITES
Small Mammals (e.g. rodents) and Birds	Euthanasia by concussion or LAT3 or LAT4.	LAT2	Refer to an approved veterinarian or consult MPI. If an approved veterinarian is not available or obtaining rapid MPI feedback is not practical, concussion by a blunt instrument followed by decapitation may be used. Concussion as a method should be used only as the last resort.	As hitchhiker, but check with DOC for endangered species e.g. CITES FAO 79
	Euthanasia by carbon monoxide gas	LAT3	The use of carbon monoxide is a very efficient method for euthanasia of smaller species as it is painless and is a quick method of death. It is highly recommended that compressed carbon monoxide from a tank is used by an experienced operator. Do not use exhaust fumes of a car. It is also useful for large numbers e.g. many one-day old chicks. If there are safe facilities where the animals can be placed within a cage and exposed to carbon monoxide and personnel are trained in its use, this gas would be the method of destruction. Note that some amphibians and reptiles are capable of holding their breath for long periods, and therefore to ensure death has occurred, contain the animal for 24 hr.	
	Euthanasia by gas	LAT4	If a small hitchhiker animal is sighted but cannot be captured, fumigation of the whole area and commodity where the animal was sighted may be required. For a rodent, fumigate with methyl bromide at 4g/m ³ for 5 hrs at 10°C minimum and fan for first 20mins other wise use the commodity specific rate. Hydrogen cyanide 4g/m ³ for 6 hrs at 4°C and above may be able to be used where penetration and adsorption are not an issue.	FAO 54
	Bait	LAT 5	When rodents are found on aircraft a treatment applicator needs to carry out a baiting programme as directed by MPI. Approved applicators of residual disinsection used by the airline may be able to provide service or other pest eradication providers can be used if access to airside aircraft is possible.	

1.2 Inedible Animal Products

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
Animal Products and Non-Viable Dried Invertebrate Specimens (e.g. dead insect collections)	Insects (Insecta) and ticks – not including Dermestidae	IAP1	Fumigate with one of the following options: <ul style="list-style-type: none"> • MeBr at 48g/m³ for 3 hrs at Vac: 91 kPa if at 21-26°C; OR • MeBr at 56g/m³ for 3 hrs at Vac: 91 kPa if at 16-20°C; OR • MeBr at 64g/m³ for 3 hrs at Vac: 91 kPa if at 10-15°C OR • EAP 1 OR SPT1 	MPI STD; ANIEQPIC.ALL	Fan circulation minimum 20 minutes at start of fumigation
	Mites (Arachnids)	IAP2	Fumigate twice with MeBr using one of the following options: <ul style="list-style-type: none"> • MeBr at 48g/m³ for 3 hrs at Vac: 91 kPa if at 21-26°C; OR • MeBr at 56g/m³ for 3 hrs at Vac: 91 kPa if at 16-20°C; OR • MeBr at 64g/m³ for 3 hrs at Vac: 91 kPa if at 10-15°C OR • EAP 1 OR SPT1 <p>The second fumigation must be 12-14 days after the first.</p>	MPI	After the first fumigation, hold securely in plastic bags and re-fumigate after 12-14 days, or if mite is non- regulated release.
	Dermestidae including <i>Trogoderma spp.</i>	SPT3	Refer to Trogoderma rates in Stored Products Schedule		
Animal fibre	Mandatory	IAP 3	See ANIFIBRE.ALL	MPI STD; ANIFIBRE.ALL	Follow IHS and/or import permit
Wool packs - used	All used wool packs must be heat treated.	IAP6	See ANIFIBRE.ALL	MPI STD; ANIFIBRE.ALL	
Fibre (sheep, goats, yaks, camels, alpacas, and llamas) for private use (up to 20kg)	Contaminated or unprocessed	IAP7	<ul style="list-style-type: none"> • Gamma irradiated at a dose of 25 kGy or 2.5 Mrad; or • Autoclaved at 120°C for at least 30 minutes; or • Heated to 85°C at 40% relative humidity for at least 15 hours; or • Fumigated with formalin (37% formaldehyde) at 50 ml/m³ mixed with potassium permanganate 35 g/m³ at 80-90% 	MPI STD; ANIFIBRE.ALL	

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
			<p>humidity in a sealed container for 24 hours (Note: This option is only for fibre with no embedded seeds).</p> <p>All packaging, semi-solid and solid waste associated with animal fibre is treated, destroyed, or disposed of by:</p> <ul style="list-style-type: none"> • Incineration; or • Autoclaving (at least 120°C for at least 30 minutes); or • Deep burial. 		
	Insects	IAP5	<ul style="list-style-type: none"> • Autoclaved at 120°C for at least 30 minutes; or • Heated to 85°C at 40% relative humidity for at least 15 hours; or • IAP1 or IAP2 or SPT1 depending on infestation 		
Ornamental animal products of animal origin (e.g. skins, drums, game trophies, blown eggs)	Where treatment is required	IAP8	<p>EITHER fumigate with:</p> <ul style="list-style-type: none"> • Formalin at 20ml/m³ and 16g/m³ potassium permanganate for 8 hrs at Atm, 18°C, 80-90% relative humidity; OR • 10% solution of formalin applied as spray in airtight container at 18°C for 8 hr, <p>OR irradiate at 50 kGy</p> <p>Note: if the item is over 32mm thick then add 1 hour per extra 4mm thickness for formalin treatment.</p> <p>All contaminated material that has been removed from the items must be treated or disposed of by:</p> <ul style="list-style-type: none"> • Incineration; or • Autoclaving (at least 120°C for at least 30 minutes) 	MPI STD; INETROIC.ALL	Items must be unpacked and any contamination cleaned off so as to completely expose the goods for formalin treatment. Note: the formalin option doesn't kill insects use SPT1.
	Insects	SPT1			
	Mites	EAP2	EAP 2 Or NST 6 Phosphine+ CO ₂ + MeBr		
	Seed contamination	IAP10	Remove contamination or heat treat to SPT4		

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
Feathers on handicrafts, artefacts, fly tying etc.	Visibly contaminated	IAP9	EITHER fumigate by mixing: <ul style="list-style-type: none"> Formalin 27ml/m³ with 16g/m³ potassium permanganate for 8 hrs at Atm, 18°C, 80-90% relative humidity; OR Formalin 27ml/m³ with 106ml/m³ of water, heated to boil off with timer power off, items kept in the sealed container for 8 hours, temperature greater than 15°C, 60-90% relative humidity; OR Irradiate at 20 kGy	MPI STD; ANIFIBRE.ALL	
	Insects	SPT1			

1.3 Edible Animal Products

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
Approved Animal Products for human consumption e.g. dried fish, milk powder, meat floss, stock cubes etc.	Insects (except Dermestidae and ticks)	EAP1	Fumigate with one of the following options: SPT1 OR <ul style="list-style-type: none"> MeBr at 64g/m³ for 3 hrs at Vac: 91 kPa if at 10-15°C; OR MeBr at 56g/m³ for 3 hrs at Vac: 91 kPa if at 16-20°C; OR MeBr at 48g/m³ for 3 hrs at Vac: 91 kPa if at 21-26°C; OR Autoclave at 100 KPa Pressure for 30 min at 118°C	FAO 79 FAO 50	Fan circulation minimum 20 minutes at start of fumigation
	Mites (Arachnids) as unwanted hitchhikers	EAP2	Fumigate twice with MeBr using one of the options in EAP1. The second fumigation must be 12-14 days after the first.	MPI	After the first fumigation, hold securely in plastic bags and re-fumigate after 12-14 days
	Dermestidae and Ticks	SPT2	Use schedule SPT2	FAO 79	
	<i>Trogoderma spp.</i>	SPT3	Use schedule SPT3	FAO 50	

1.4 Equipment used with Animals or Water

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
Used equipment	Dermestidae, Insects, mites, Ticks, Trogoderma		Use the selection on the previous page for Edible Animal Products or VCE1a depending on the equipment and the pest		Applies to all used animal equipment contaminated with insects unless being heat treated or frozen.
Used equipment associated with terrestrial animals (NOT including equine or birds)	Wet and/or visibly contaminated	EAP5	<ul style="list-style-type: none"> Washed or cleaned to remove any visible contamination; and Disinfected with an agent listed in the MPI List of Approved Disinfectants for General Transitional Facilities for Uncleared Goods (Note: dog and cat used equipment contaminated only with hair or fur does not require disinfection) 	MPI STD; ANIEQUIP.ALL	Note this includes animal bedding or apparel NOT accompanying an animal. Animal bedding accompanying an animal is not eligible for clearance and must be disposed of as biosecurity waste.
Used equipment associated with equine animals	Where required in ANIEQUIP.ALL	EAP5a	<ul style="list-style-type: none"> Washed thoroughly using a standard detergent; or Cleaned and treated with a disinfectant listed in the MPI List of Approved Disinfectants for General Transitional Facilities for Uncleared Goods; or Fumigated with 10% formaldehyde (approximately 30% formalin) for 8 hours; or Heated to a temperature of at least 60°C for at least 10 minutes. 	MPI STD; ANIEQUIP.ALL	Choice of treatment depends on treatment availability and the tolerance of the item to be treated.
Used equipment associated with birds	Mandatory		<ul style="list-style-type: none"> Thoroughly washed using a standard detergent and treated with a disinfectant listed in the MPI List of Approved Disinfectants for General Transitional Facilities for Uncleared Goods; or Fumigated with 10% formaldehyde (approximately 30% formalin) for 8 hours. 	MPI STD; ANIEQUIP.ALL	
Used equipment associated with marine aquatic animals or activities	Wet and/or visibly contaminated	EAP5b	EITHER: Soaking the equipment in water kept above 60°C for at least 1 minute; OR Soaking the equipment to a point when all absorbent areas of the item have been saturated with a solution of 5% volume/volume	MPI STD; ANIEQUIP.ALL	Clean and dry equipment does not require treatment.

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
and aquaculture equipment			concentration of dishwashing detergent, nappy cleaner antiseptic hand cleaner (chlorhexidine or chloroxylonol based), THEN treated on all surfaces with this solution for at least 1 minute OR Soaking the equipment for 10 minutes in, or if a hard surface wiped with, iodine solution at 250mg per litre (Betadine ®); OR Soaking the equipment for 10 minutes in, or if a hard surface wiped with, household bleach at 50mg Cl per litre; OR Soaking the equipment for 10 minutes in, or if a hard surface wiped with, sodium hydroxide solution consisting of 1% hydroxide and 0.1% Teepol ®.		
Used equipment associated with fresh water aquatic animals or activities (not including adsorbent material such as felt-soled footwear)	Wet and/or visibly contaminated	EAP5c	EITHER: Freeze until completely solid; OR Soaking the equipment in a solution of 5% volume/volume of either dishwashing detergent, nappy cleaner, antiseptic hand cleaner (chlorhexidine or chloroxylonol based) or salt (NaCl) for at least 1 minute (a 5% solution is 500mL or 2 cups with water added to make 10L); OR Soak in water kept above 45°C (uncomfortable to the touch) for at least 20 minutes; OR Soak in water kept above 60°C for at least 1 minute; OR Soak in a household bleach solution with a minimum concentration of 2% - 200 mls of bleach to 10 L of water for at least 1 minute.	MPI STD; ANIEQUIP.ALL	Clean and dry equipment does not require treatment.
Used equipment containing absorbent material (other than felt soles)	Wet and/or visibly contaminated	EAP5d	EITHER; Freezing the equipment until completely solid; OR Soaking the equipment to a point when all absorbent areas of the item have been saturated with a solution of 5% volume/volume concentration of dishwashing detergent, nappy cleaner antiseptic, hand cleaner (chlorhexidine or chloroxylonol based) or salt (NaCl), THEN treated on all surfaces with this solution for at least 1 minute; OR Soaking the equipment to a point when all absorbent areas of the item have been saturated with a solution of 2% volume/volume concentration of household bleach, THEN treated on all surfaces with this solution for at least 1 minute;	MPI STD; ANIEQUIP.ALL	Clean and dry equipment does not require treatment.

Commodity/Product	Reason for Treatment	Short Code	Treatment procedure to follow	Source	Comments
			<p>OR Soaking the equipment to a point when all absorbent areas of the item have been saturated with water kept above 45°C, THEN treated on all surfaces with a soak of at least 20 minutes in water kept above 45°C;</p> <p>OR Soaking the equipment to a point when all absorbent areas of the item have been saturated with water at no less than 60°C, THEN treated on all surfaces with water kept above 60°C for at least 1 minute.</p>		
Used felt-soled fishing footwear (waders and boots)	If the footwear is not dry to the touch or has been used within last 2 months	EAP5e	<p>EITHER Freezing the entire felt sole until completely solid;</p> <p>OR Completely immersing the entire felt sole in water kept above 45°C containing 5% volume/volume concentration of dishwashing detergent or nappy cleaner for at least 30 minutes;</p> <p>OR Completely immersing the entire felt sole in water kept above 45°C for at least 40 minutes.</p>	MPI STD; ANIEQUIP.ALL	

1.5 Forest Produce

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Woodware, Wood panels, Sawdust, Wood Chips, Wood Shavings and Wood Wool, Wood (up to 200 mm in thickness or cross-section); and Other miscellaneous products e.g. pine/conifer cones, needles, twigs, smudge sticks etc. Note 4	Invertebrates See Note 22 for ants	FPT1	MeBr	Atm	48gm ³ 64g/m ³ 80g/m ³	21+ 16-20 10-15	24hrs	MPI	Fan 20 mins at the start, filleted 5mm every 200mm; if greater than 200mm thick use FPT6. Plastic wrapping opened or perforated, wood must not painted or lacquered on all surfaces.
			MeBr	Vacuum	64 g/m ³	10 +	4 hrs	MPI	
			Phosphine	Atm	200ppm minimum	10-15 16-20 21-25	15 days 12 days 9 days	MPI STD; Wood Packaging:	Top-up needed to maintain concentration due to sorption by wood. Note 7
			HT	Atm		56 +	30 mins	ISPM 15	
			Freezing			-18C	7days		Rust & Reiersen 1998 Core temperature. Note 2
	Fungi, Extraneous organic material and Devitalisation	FPT2	HT			70	4 hrs		Core temperature. See Note 3 below
			Incineration	Incinerate to ash at a MPI- approved facility or carried out under supervision by MPI					Transport risk items to treatment site in pest-proof containers, e.g. completely wrapped with plastic.
			Autoclaving	100 kPa		120	10 min	MPI	
			Irradiation	PPT2					

Note 2: Freezing could cause damage to objects made of layers such as paintings, lacquer ware, photographs, and ivory. Objects of one material, such as wood, or paper, are the best candidates for freezing. Self-defrosting freezers to be avoided as don't maintain a steady temperature. When removing from the freezer, leave it in the bag and wrap it so it will reach room temperature slowly.

Note 3: It takes time for the core temperature of forest produce to reach 70°C. If it is not possible to measure the core temperature accurately, use the sliding scale for HT shown FPT4; that is, with increased thickness of wood the exposure time must be increased.

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
cont...	Extraneous organic material	FPT3	Decontaminate by sweeping and/or washing off and to be collected and destroyed in an approved manner.						
	Fungi	FPT3a	Deep burial at a MPI approved commercial landfill or other MPI approved site. Must be buried deep enough to allow a minimum of 2 metres land-fill coverage on the same day. A CTO direction is required.						Risk items must be transported within a pest-proof enclosure.
	Pathogens (including fungi), Extraneous organic material (e.g. leaves, twigs, soil), Insects, Devitalisation (e.g. un-processed burls) Note : Not for seed devitalisation	FPT4	HT	Wood Thickness		Temp. °C	Time	MPI Ramsfield et al 2010, Chidester 1956, CTO Plants Direction 20170022	If not measuring core temperature use the schedule time for thickness Unprocessed burls and potentially viable materials, in particular, must be rendered nonviable (devitalisation) Note: maintain 90%+ humidity to prevent warping and quicker penetration of heat.
				Core temperature		70	4 hrs or		
						80	2 hrs or		
						90	1 hr or		
						100	30 minutes or		
						110	20 minutes or		
						120	15 minutes		
				0-25 mm		70	4hrs		
				25-38 mm		70	5 hrs		
				38-50 mm		70	6 hrs		
				50-75 mm		70	8 hrs		
				75-100 mm		70	10 hrs		
				100-150mm		70	14 hrs		
				150-200mm		70	18 hrs		
				200-250mm		70	22 hrs		
				250mm+		70	26 hrs		

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Woody items for human consumption (kava sticks, cinnamon bark etc.)	Insects	SPT1							
Note 4: The Forest Produce items listed in the commodity/product column are defined as per the relevant Import Health Standard.									
Wood Packaging (as defined in the Wood Packaging Import Health Standard)	ISPM 15 Compliance OR Invertebrates (For Fungi use FPT3a, FPT2 or FPT4)	ISPM 15	HT	Kiln-drying, chemical pressure impregnation or other treatments may be used as a means of achieving heat treatment provided that the above temperature and time requirements are met. Atm		56°C	30mins	MPI STD: Wood Packaging: ISPM 15	All wood packaging material must achieve a minimum temperature of 56°C throughout the entire profile of the wood (including at its core) for duration of at least 30 minutes.
			MeBr	Atm	48g/m ³ with 24 g/m ³ end reading or 650 g.h/m ³ C:T	21 +	24 hrs	ISPM 15	20 minutes of fan at the start, filleted or otherwise separate layers by at least 5mm every 200mm
					56g/m ³ with 28g/m ³ end reading or 800g.h/m ³ C:T	16-20	24 hrs		
					64g/m ³ with 32 g/m ³ end reading or 900g.h/m ³ C:T	10-15	24 hrs		

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
		FPT1	Phosphine						Note: Not approved to be ISPM 15 stamped
Bamboo, Cane, Rattan, Willow And Bark (includes wood items containing bark, bark chips, cork, bark pencils and other items containing unprocessed bark)	Insects See Note 18 for ants.	FPT5	MeBr	Atm	48g/m ³ 64g/m ³ 80g/m ³ 96g/m ³ 64g/m ³	26 + 21-25 16-20 10-15 10+	24 hrs 24 hrs	Barak et al 2009	Fan circulation minimum 20 minutes at start of fumigation Plastic wrapping opened or perforated
			HT			56	30min	ISPM 15	
	Invertebrates, Pathogens, Extraneous organic material	FPT4	HT						Note: maintain 90%+ humidity to pre vent warping and achieves quicker penetration of heat. See Note 3 above.
Poles, Piles, Rounds, And Wood (greater than 200mm in thickness or cross-section)	Invertebrates	FPT6	MeBr		160 g/m ³ 120 g/m ³	10-15 + 16 +	48 hrs	Scheffrahn et al 1965, Cross 1992	Must be filleted every layer
	Invertebrates, Pathogens, Extraneous organic material	FPT4	HT						Note: maintain 90%+ humidity to pre vent warping and achieves quicker penetration of heat. See Note 3 above.
Sleepers	Invertebrates, Pathogens, Extraneous organic material	FPT4	HT					MPI IHS Pole, Piles, Rounds and Sleepers	
Wooden decking (associated with used vehicles etc.)	Fungi in wooden decking	Refer to Commodity/Product "Vehicles, machinery, containers, parts, tyres, equipment (not used with animals) etc." for treatment options against fungi found in used wooden decking associated with imported used vehicles, trucks and utilities. However, if fungal rot has set in and wood decay is obvious, the wooden decking must be heat treated or removed and destroyed.							

1.6 Stored Products

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage a.i.	Temp. °C	Time	Source	Comments
General Stored Products in bags & cartons only up to 50kg. See Note 5 below (Refer below for additional treatments of specific stored product items)	Insects (Insecta) except <i>Trogoderma</i> spp.	SPT1	MeBr	Atm	32 g/m ³ 40 g/m ³ 48 g/m ³	21 + 16-20 10-15	24 hrs	FAO 79	Fan circulation minimum 20 minutes at start of fumigation. See Note 22 for ants.
				Vac:91 kPa	48 g/m ³ 40 g/m ³ 32 g/m ³	10-15 16-20 21 +	3 hrs		
			Phosphine	Atm	2 g/m ³	10-15 16-20 21-25 26 + (max 35)	15 days 12 days 9 days 5 days	MPI	One day less can be subtracted for cylinderised or generated phosphine. Note 7
			Freezing			-18 or less	7 days	MPI	
			HT	Atm		56 +	30 mins	MPI	The core temperature of product must reach 56°C
Bulk containerised stored products, 50kg plus See Note 6 below (Refer below for additional treatments of specific stored product items)	Insects (Insecta) except <i>Trogoderma</i> spp.	SPT2	MeBr	Atm	48 g/m ³ 64 g/m ³ 80 g/m ³	21 + 16-20 10-15	24 hrs	FAO 79	Fan circulation minimum 20 minutes at start of fumigation. See Note 22 for ants.
			Phosphine	Atm	2 g/m ³	10-15 16-20 21-25 26 + (max 35)	15 days 12 days 9 days 5 days	MPI	One day less can be subtracted for cylinderised or generated phosphine. Note 7
			HT			60 +	10 mins	MPI	The core temperature of product must reach 60°C.
			Freezing			-18 or less	7 days	MPI	Core temperature

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage a.i.	Temp. °C	Time	Source	Comments
General Stored Products in bags & cartons, and bulk containerised See Note 6 below	<i>Trogoderma</i> spp only	SPT3	MeBr	Atm	40 g/m ³ 56 g/m ³ 72 g/m ³ 96 g/m ³ 120 g/m ³	32 + 27-31 21-26 16-20 10-15	12 hrs	FAO 50	Fan circulation minimum 20 minutes at start of fumigation.
			HT			60 +	30 mins	MPI	The core temperature of product must reach 60°C.
Note 5: Stored products (in bags and cartons and in bulk) refers to dried vegetable, fruit, grain, seed, edible nuts, etc. imported for human consumption, processing or stock food. Stored products do not include fresh fruit and vegetables.									
Note 6: High MeBr dosages used may not be acceptable on products for human consumption, consult MPI Food Standards.									
Note 7: Phosphine dosage is active ingredient (normally 1/3 of pellet or tablet) not weight of product applied.									
General Stored Products in bags & cartons, and bulk containerised See Note 4 above	Devitalisation, Fungi	SPT4	HT	40% RH (min)		85	15 hrs	FAO 50	Destroys viability e.g. of seeds, nuts and pathogens. Will also kill insects including <i>Trogoderma</i> spp
			Autoclave	Pres:100 kPa		120	30 mins	FAO 50	
General Stored Products in bags & cartons	Mites	SPT5	MeBr	Atm	32 g/m ³ 40 g/m ³ 48 g/m ³	21 + 16-20 10-15	24 hrs	MPI	Re-fumigate after 12-14 days.
Stored products; bulk containers	Mites	SPT6	MeBr	Atm	48 g/m ³ 64 g/m ³ 80 g/m ³	21 + 16-20 10-15	24 hrs	MPI	Re-fumigate after 12-14 days. Note 6:
Citrus Products (including dried peel and dried citrus belonging to genera <i>Citrus</i> , <i>Fortunella</i> & <i>Poncirus</i>)	Bacteria, micro- organisms	SPT7	HT	40% RH (min)		85	8 hrs	MPI	Treatment kills pathogens
			Autoclave	Pres:100 kPa		120	30 mins	MPI	

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage a.i.	Temp. °C	Time	Source	Comments
Dried herbs and leaves									
Stock food (plant derived animal feed)	Devitalisation/ Pathogens	SPT8	HT	40% RH (min)		85	15 hr	MPI	Destroys viability e.g. of seed and pathogens
			Autoclave	Pres:100 KPa		120	30 min	MPI	
			Irradiation		25 kGy			MPI	
	Insects	SPT2	MeBr						
	Trogoderma	SPT 3	MeBr						
Nuts	Insects	SPT 9	MeBr	Atm	16 g/m ³	21	12 hr	MPI	
				Vac 91kPa	48 g/m ³	21	1 hr	MPI	
Nuts	Devitalisation	SPT4	HT						
Plant products	Devitalisation	SPT10	Grinding						No whole seeds remaining
Coffee/Cocoa Beans	Insects	SPT11	CO ₂ - OR SPT1		Min 35%	15	15 days	MPI	For bags of all sizes.

1.7 Plant Products

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
All Plant Products including broom millet, corn dollies, dried flowers & foliage, millet spray, straw, etc.	Devitalisation (plant & seed) and Pathogens (e.g. fungi, bacteria)	SPT4	HT	40%RH (min)		85	15 hr	FAO 50	Destroys viability (e.g. plant & seed) and kills fungi, bacteria etc. Autoclaving appropriate for <i>Nostoc commune</i> .
			Autoclave	Pres:100 KPa		118	30 min	FAO 50	
	Insects (Insecta) except <i>Trogoderma</i> spp.	SPT1							
	<i>Trogoderma</i> spp only	SPT3	MeBr	Use rates as prescribed for <i>Trogoderma</i> spp found in Stored Products SPT3					Fan circulation minimum 20 minutes at start
			HT	Use rates as prescribed for <i>Trogoderma</i> spp found in Stored Products SPT3					
Plant Products not for human consumption (applies only to products in IHS's where this treatment is stated as an option)	Renders incapable of procreation (e.g. seed, Arthropods, pathogens etc.)	PPT2	Irradiation		25 kGy			MPI	
Brushwood Group 1 as per IHS	Devitalisation and Pathogens	SPT4 or PPT2						Dried Plant Material IHS	
Brushwood Group 2 as per IHS	Regulated pests	FPT5 or PPT2						Dried Plant Material IHS	
Mosses & Lichens	Devitalisation	SPT4							

1.8 Nursery Stock

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Active ingredient	Application Rate	Time	Source	Comments
All whole plants and cuttings e.g. cuttings, scions, bud wood, marcots, off-shoots	Insects (Insecta) Only See Note 8 below	NST1	Organophosphate	Chlorpyrifos	2.4g a.i./L of dip/spray	2-5 mins	MPI	Non-ionic surfactant required for dipping
				Dimethoate	0.32g a.i./L	2-5 mins		Non-dormant material only
				Pirimiphos-methyl	0.475g a.i./L of dip/spray	2-5 mins		Non-ionic surfactant required for dipping
				Acephate	0.75g a.i./L of dip/spray	2-5 mins		Non-dormant material only
			Carbamate	Carbaryl	1.2g a.i./L	2-5 mins		
			Diacylhydrazine	Tebufenozide	0.06 g a.i./L	2-5 mins		
			Neonicotinoid	Imidacloprid	0.16g a.i./L of dip/spray	2-5 mins		Non-dormant material only
				Thiacloprid	0.16g a.i./L of dip/spray	2-5 mins		
			Pyrethroid	Deltamethrin	0.25 a.i./L	15 mins		
			Pyrethroid	Esfenvalerate	0.06g a.i./L	15 mins		
			Spinosyns	Spinosad	0.048g a.i./L	2-5 mins		Dip/spray at room temperature

NOTE 8: The above contact and systemic insecticidal dips may be used instead of fumigation but only if the packaging material is separately fumigated (FVT8) or destroyed. **Two chemicals must be used for any treatment, one organophosphate and one other insecticide** must be used. Plants are to be immersed completely or all surfaces sprayed to runoff. For dipping, the treatment time is normally 2 minutes (except those 15min) but must be increased to 5 minutes if bubbles remain present on the plant surface. The chemicals, if compatible, may be combined as a single treatment. Dip solutions must be used no more than twice or as per manufacturer's recommendations.

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
All whole plants and cuttings e.g. cuttings, scions, bud wood, marcots, off-shoots	Insects	NST2 Or NST6	MeBr	Atm	48 g/m ³ 40 g/m ³ 32 g/m ³ 28 g/m ³	10-15 16-21 22-27 28-32	2 hrs		Packaging to be dipped or fumigated as per FVT9 or destroyed. See Note 22 for ants and Note 9
	Insects	NST3	Hot Water AND Chlorpyrifos + non-ionic surfactant		2.4 g a.i./L	24°C then 45°C	2hrs 3 hrs 2 mins		Maximum of 2 times use of solution or as per manufacturer's recommendations
	Spiders	NST4	Chlorpyrifos		2.4 g a.i./L	2 mins			Packaging to be dipped or fumigated as per FVT9 or destroyed
	Molluscs	NST5	Methiocarb		0.75 g a.i./L	5 mins			
	Mites/Insects/ Spiders	NST6	Phosphine+ CO ₂ + MeBr OR	Atm	3g/m ³ +5% CO ₂ 13g/m ³	15	4 hrs	Kawakami et al 1996	Add the MeBr into chamber directly after the PH ₃ /CO ₂ mix (Eco2fume tm) has been added.
			Phosphine + CO ₂ + MeBr OR Note 6	Atm	3g/m ³ +5% CO ₂ 13g/m ³	20	3hrs		
			Avermectin	Abamectin	0.018 g/L		2-5 mins	MPI: Importation of Nursery Stock and labels'	Non-ionic surfactant required for dipping
			Organophosphate	Dichlorvos	0.9 g/L		2-5 mins		
			Organophosphate	Acephate	0.75 g/L		2-5 mins		Non-dormant material only
			Organophosphate	Chlorpyrifos	2.4 g/L		2-5 mins		Non-ionic surfactant required for dipping
			Organophosphate	Dimethoate	0.65 g/L		2-5 mins		Non-dormant material only
			Organophosphate	Pirimiphos- methyl	0.475 g/L		2-5 mins		Non-ionic surfactant required for dipping

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
	Fungi	FNS8	If waiting for fungi identification plants can be treated as per FNS8 and directed to PEQ pending result. BSI must be informed of identification results. Further action may be required.						Packaging to be treated the same as the product or destroyed
	Bacteria/ Virus		Hold consignment. Following identification contact MPI.						Packaging to be treated the same as the product

NOTE 9: Insecticidal dips may be used instead of fumigation but only if the packaging material is separately fumigated (NST6) or destroyed. Chemical treatment: spray, or preferably immerse in a dip(s) with agitation, according to the following conditions. The plants must be sprayed/dipped using either Abamectin or two active ingredients belonging to different chemical groups chosen from the table below. For dipping, the treatment time is normally 2 minutes but must be increased to 5 minutes if bubbles remain present on the plant surface. Dip solutions must be used no more than twice or as per manufacturer's recommendations. All treatments must be carried out in accordance with manufacturer's recommendations using either the recommended label rate or the rates shown in the table above.

Note 10: For MeBr fumigation of live plant material with leaves, maintain a high percentage of humidity (above 75 percent) in the chamber. Protect actively growing or delicate plants from the direct air flow of fans and do not enclose in plastic after fumigation.

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Active ingredient	Dosage	Time	Source	Comments
Dormant bulbs, root divisions, corms, tubers and rhizomes	Insects (not mites)	NST7	NST2, OR NST3, OR NST6, OR Apply two active ingredients from different chemical groups below.					Packaging to be dipped or fumigated as per FVT8 or destroyed. See Note 22 for ants.
			Phenylpyrazole	Fipronil	0.2 g.ai./L	5 mins		non-ionic surfactant required
			Organophosphate	Pirimphos-methyl	3.25 g a.i./Lcheck	5 mins		non-ionic surfactant required
			Chloronicotinyl	Imidacloprid	1.26 g a.i./L	5 mins		
	Nematodes	NST8	NST2 + immersion in Fenamiphos, 2 g a.i./L for 1 hour OR Hot water at 44°C for 3 hr (pre warm at 24°C for 2 hr) + immersion in Fenamiphos, 2 g a.i./L for 1 hour				MPI	Maximum of 2 times use or as per manufacturers' recommendations. Packaging to be dipped or fumigated as per FVT8 or destroyed
	Mites	NST9	NST6 OR Hot water at 44°C for 3 hr (pre warm at 24°C for 2 hr).					Packaging to be dipped in a miticide or fumigated as per NST6 or destroyed

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Active ingredient	Dosage	Time	Source	Comments
Dormant bulbs, root divisions, corms, tubers and rhizomes	Fungi	NST10	Dip with one of the following chemicals then hot water at 44°C for 3 hr (pre warm at 24°C for 2 hr); a) Sodium hypochloride 10% a.i., Ph 6.5-7 for 5 mins with agitation b) Bromo-chloro-dimethylhydantoin, 8.1-16 g/L c) Formaldehyde, 0.4% for 2hrs d) Peroxyacetic acid, 80 ppm for 5 mins, wetting agent required e) Chlorine-dioxide, 80 mg/L for 5 mins with agitation OR Dip in two active ingredients from different chemical groups below.					Dipped at room temp unless stated. Before any treatment is carried out, any bulbs with established infections are to be sorted & destroyed. Packaging to be dipped or heat treated SPT4 or destroyed
			Benzimidazole (wetting agent required)	Thiaben-dazole	1-1.3 g/L	15-30mins		
			Benzimidazole	Thiophanate-methyl	0.75 g/L	15-30mins		
			Dimethyldithio-carbamate	Thiram	11.2 g/L	15mins		
			Imidazole	Prochloraz	0.25 g/L	15mins		
			Strobilurin	Azoxystrobin	0.95 g/L	15mins		
Truffles (Tuber spp)	Insects	NST11	Sodium hypochloride		100ml/l of 5% a.i. bleach	30mins		Rinse 3 times in fresh water after treatment

1.9 Fresh Flowers and Foliage

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Fresh Flowers and Foliage only	Snails (Mollusca); See below.	FNS4	MeBr	Atm	48g/m³	12 +	24 hrs	MPI	Fan circulation minimum 20 minutes at start of fumigation. See Note 10 below.
		NST5	Methiocarb						
	Giant African Snail, <i>Cernuella virgata</i> & <i>Cochicella acuta</i>	VCE2	The high dosages of MeBr which would be required here are likely to be phytotoxic to plants.						Fan circulation minimum 20 minutes at start of fumigation
	Mosses & Lichens	FNS5	Recondition consignment by removing all mosses and lichens for destruction.						The consignment must be re-inspected prior to release.
	Large hitchhikers such as worms		Hold consignment and following identification contact MPI.						100% inspection & removal may be an option.
	Only for ants, aphids, earwigs, moths, psocids, thrips	FNS6	Pestigas (pyrethrum + CO ₂) + ECO2 Fume (Phosphine + CO ₂). Or NST6	For rates & details refer Note 12 below	15 +	15 hrs	Approved by MPI	For requirement to re- inspect, see Note 13 below	
	Mites, insects & spiders.	NST6	NST6 or extend FNS6 to 24hrs						Kawakami et al 1996. Note 9.

Note 11: This MeBr treatment for snails on fresh flowers, foliage and nursery stock may be permitted only if a full re-inspection is conducted after the MeBr fumigation is completed and all the gas fully discharged. If live snails are found during the re-inspection, the whole consignment must be held and MPI notified immediately.

Note 12: Spray with Pestigas (synergised pyrethrum with carbon dioxide as a carrier gas) at 4.4 g/m³ (within an airtight enclosure or fumigation cell) and hold for 10 minutes. This is followed by a spray with ECO2 Fume (Phosphine with carbon dioxide as a carrier gas) to give a concentration of 700 ppm a.i./m³ of PH₃ and hold for 15 hours at a minimum air temperature of 15°C.

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Fresh Flowers and Foliage only	Insects (Insecta) only	FNS7	Contact insecticides:	100 g/L dichlorvos	4 ml/litre of water		15 mins	MPI STD 155.02.06	The contact and systemic insecticidal dips may be used instead of fumigation but only if the packaging material is separately fumigated or destroyed. These chemical dips are not acceptable on goods for human consumption.
			(Choose one, plus a systemic insecticide)	25 g/L permethrin	1 ml/litre of water		15 mins		
				475 g/L primiphos methyl	1 ml/litre of water		15 mins		
				240 g/L taufluvalinate	0.4 ml/litre of water		15 mins		
			Systemic insecticides:	195 g/L acephate (soluble concentrate)	0.8 g/litre of water		15 mins	MPI STD 155.02.06	Two chemicals (active ingredients) must be used for any treatment; one contact insecticide and one systemic insecticide must be used. Plants are to be immersed completely in the chemicals. The chemicals, if compatible, may be combined as a single treatment.
			(Choose one, plus a contact insecticide)	970 g/kg acephate (water soluble granule)	1 ml/litre of water		15 mins		
				500 g/L dimethoate	0.4 ml/litre of water		15 mins		
				600 g/L methamidaphos	1.6 ml/litre of water		15 mins		
				350 g/L imidacloprid	0.45 ml/litre of water		15 mins		

Note 13: From Jamieson 2005: If any live Arthropod pests different from those mentioned here are found during inspection, and the importer wishes to use this treatment option, leave some of the live pests in at least 5 (or as many as possible) of the cartons they were found in. Mark the cartons clearly so they can be easily identified. Following treatment inspect the marked cartons to ensure all the pests concerned are killed and if the pests are killed, the consignment can be released. If the pests are alive, offer re-fumigation with methyl bromide (if applicable) or re-ship/destroy etc. If insufficient Arthropod pests are “seeded”, a full re-inspection is required. Notify MPI of the results.

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Time	Source	Comments
Fresh Flowers and Foliage only	Insects (Insecta) only	FNS7 cont...	Mineral Spraying oils or Surfactants				See Note 14 below
	Insects (Insecta) and slugs	FVT1 or NST6	Methyl Bromide see Page 37 Methyl Bromide & Phosphine mix				See Note 22 for ants and note 9.
	Spiders	NST6 or NST4					
	Fungi only	FNS8	125 g/L chlorothalonil & 125 g/litre thiophanate-methyl (e.g. Greenguard) Or 250 g/L chlorothalonil & 250 g/L thiophanate-methyl (e.g. Taratek 5F) Or Other treatments as approved by MPI	6 ml/litre of water 3 ml/litre of water	15 mins 15 mins	MPI NZ Agri- chemical Manual	See Note 14 below. These fungicides may be used as treatment options against fungi especially since final identifications of fungi may take a long time. All plants to be treated are to be immersed completely in the chemicals.
	Devitalisation	FNS9	1.8 g a.i./L. glyphosate Or 3.65 ml a.i./L oryzalin*	Immerse the stems etc to within 50 mm of the flowers for 20 minutes. The temperature should be a minimum of 15°C high enough to ensure transpiration is taking place to reduce viability			*Blanchon et al 2011

Note 14: If a compatible (refer NZ Agrichemical Manual) adjuvant oil or a surfactant (improves wetting, penetration, adhesion) is used in the dip(s), the dipping time may be reduced from 15 min to 5 min but all air bubbles must have dispersed from the flower/foilage surface ; except for bulbs, corms, tubers and rhizomes when dipping time will remain 15 min.

1.10 Fresh Fruit and Vegetables

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Fresh Fruit and Vegetables (Pineapples & Bananas see page 31) See Notes 15 and 16 below (Refer below for additional treatments for some specified fruits and vegetables)	Insects (except fruit flies) and Slugs. Spiders see next pages.	FVT1	MeBr	Atm	48 g/m ³ 40 g/m ³ 32 g/m ³ 24 g/m ³	10-15 16-21 22- 27 28 -32	2 hrs	FAO 79/ MPI/USDA 305a	Three pulp temperatures to be used to obtain cold spot then continuous monitoring of that pulp. Fan circulation minimum 20 minutes at start of fumigation. Lower rate may be better for the produce. Note 26
			MeBr	Atm	35 g/m ³ 26.5 g/m ³	10-15 16-21	3 hrs	Misumi 2009	
Grapes & Plums from Chile	Failed in transit cold treatment	FVT1c	MeBr	Atm	48 g/m ³ 40 g/m ³	11-16 16-21	2 hrs	MPI	
Grapes from Australia, Chile, Italy and USA	Spiders (Araneae)	FVT8	MeBr	Atm	48 g/m ³	12 +	8 hrs	MPI - Zettler unpublished	Inner carton /box temperature to be used.
Grapes USA	Failed in transit cold treatment	FVT1b	MeBr	Atm	40 g/m ³	15.5+	2 hrs		
	Insects	FVT1							
Pomegranates	Spiders (Araneae)	FVT8							
Stone fruit USA	Failed in transit cold	FVT1a	MeBr	Atm	48 g/m ³ 40g/m ³	12-16.9 17+	2 hrs	MPI	Three pulp temperatures to be used to obtain cold spot then continuous monitoring of that pulp. Fan circulation minimum 20 minutes at the start.
<p>Note 15: Some treatments for fresh fruit and vegetables are contaminant or commodity specific e.g. HCN for bananas. If a specific treatment is not identified for a commodity, then use the generic treatments identified.</p> <p>Note 16: It is not acceptable to use chemical dips for commodity items used for human consumption (e.g. fruit, vegetables, stored products etc.)</p>									

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Fresh Fruit and Vegetables	Snails (Mollusca), also see below	FVT3	MeBr	Atm	48 g/m ³	12 +	24 hrs	MPI	Fan circulation minimum 20 minutes at start of fumigation See Note 17 below.
	Giant African Snail, <i>Cernuella virgata</i> & <i>Cochicella acuta</i>	The high dosages of MeBr (VCE2) which would be required are likely to be phytotoxic to plants and produce, and not acceptable for human consumption. This effectively means this is not a suitable treatment option for fresh fruit and vegetables.							
	Bacterial/ Fungi/ Virus	Hold consignment! Contact the MPI Fresh Produce Import team							
	Fruit flies & <i>Drosophila suzukii</i>	Hold consignment! Following identification, use BORIC (pest data base) and follow instructions.							
Fruit Fly Host Material (i.e. all fruits and vegetables that are hosts to fruit flies)	Arthropods (including Insecta) & Devitalisation	FVT4	Freezing			-18 or less	7 days	FAO 50	A fully calibrated and reliable thermograph recording may be required for the 7-day exposure period.
Non-Fruit Fly Host Material (i.e. all fruits and vegetables not attacked by fruit flies)	Arthropods (Arthropoda, including Insecta) & Devitalisation	FVT5	Freezing			-10 or less	7 days	FAO 50	A fully calibrated and reliable thermograph recording may be required for the 7-day exposure period.
Note 17: This MeBr treatment for snails on fresh fruit and vegetables may be permitted only if a full re-inspection is conducted after the MeBr fumigation is completed and all the gas fully discharged. If live snails are found during the re-inspection, the whole consignment must be held and MPI notified immediately.									
Pineapples	Insects	FVT1 or FVT6							Importers choice
Bananas	Surface insects (does not treat wood pests)	FVT6	HCN	Atm	3 g/m ³ (2620ppm)	13.5 +	2 hrs See Note 18 below.	BNZ/ Pharmo-chem Co.	Fan circulation (1m/sec minimum) throughout treatment, plastic carton liners perforated or removed, inner carton/ box temperature to be used and 50% load factor

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments		
Root crops associated with the soil e.g. ginger, garlic, taro, yam, cassava, etc.	Insects, Nematodes, Slugs & Worms	FVT9	MeBr	Atm	48 g/m ³ 48 g/m ³ 48 g/m ³ 40 g/m ³ 32 g/m ³	10-15 16-20 21-26 27-31 32 +	4 hrs 3.5 hrs 3 hrs 3 hrs 3 hrs	USDA T101-Z-1	Pulp temperature to be used. Fan circulation minimum 20 minutes at start of fumigation.		
			Hot air								Rates are being investigated
			Hot water								Rates are being investigated
	Weed seeds	FVT10	Reconditioning to remove weed seeds. Verification by inspector supervision or by MPI inspection of a new random sample. Where reconditioning is removal of contamination site (e.g. cutting tops off pineapples) verification is by visual MPI check								
	Soil	FVT11	Either washing or scraping or brushing then reinspection								
Truffles (Tuber spp)	Insects	NST11									
Note 18: If discoids are used rather than bottled hydrogen cyanide (HCN) gas, add 30 minutes to the exposure times mentioned above to allow sufficient time for HCN gas to form. Commodity must be dry as any moisture will absorb HCN and fumigation enclosure must have painted surfaces.											

1.11 Seeds

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Interception treatments for Seeds for Sowing									
Seeds For Sowing Note: 19	Insects (Insecta) except Trogoderma spp. (see below), and Pea weevil (<i>Pisum</i> (peas) see SST16	SST1	MeBr	Vac:91 KPa	40 g/m³	20	3 hrs	FAO 79	Fan circulation minimum 20 minutes at start of fumigation See Note 22 for ants.
			Or MeBr	Atm	16 g/m³ 24 g/m³	20 + 10-19	24 hrs	FAO 79	
			Or Phosphine	Atm	2 g/m³	10 -15 16 - 20 21 - 25 26 + (max 35)	7 days 6 days 5 days 4 days	FAO 54	One day can be subtracted if bottled or generated phosphine is used.
			Or Freezing			-18°C	7 days	CTO	Up to and including maximum 20kg. Excludes Pisum, Note: Freezing at owners risk for seed viability
	Trogoderma spp.	SPT3	MeBr	Use rates as prescribed for Trogoderma spp. found in Stored Products. Potential for reduction in germination.					Fan circulation minimum 20 minutes at start of fumigation
	Mites (Arachnida)	SST2	MeBr	SST1 then hold securely and re-fumigate after 12-14 days.			MPI		This treatment will effect viability.
Seed and soil as contaminants	Dressing out or sorting or reconditioning of seeds is a viable "treatment" option in some instances. The method here involves manual or mechanical remove of all biosecurity risk contaminants for destruction by an approved method. Reconditioning must be done under supervision by an Inspector. The reconditioned seed consignment must be re-inspected by an Inspector to ensure freedom from contaminants prior to final release.								
Bacteria/Fungi/ Virus	Hold consignment. Send for ID at an MPI-approved facility. Following identification, Inspector to use the BORIC database and follow instructions.								

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Treatment requirements for seed imported under part 2 of the IHS 155.02.05: Seeds for Sowing									
<i>Abies</i>	Fungi	SST13	Captan OR Thiram		2 g a.i./kg.			MPI IHS 155.02.05	
<i>Acer</i>	Fungi	SST13							
<i>Agropyron/ Agrostis</i>	Fungi	SST7	1) Carboxin and Thiram OR 2) Carboxin and Captan OR 3) Imazalil and Triadimenol OR 4) Imazalil and Flutriafol		1) 0.8g a.i. and 1.0g a.i./kg 2) 0.8g a.i. and 0.7g a.i./kg 3) 0.08g a.i. and 0.22g a.i./kg 4) 0.08g a.i. and 0.08g a.i./kg			MPI IHS 155.02.05	
<i>Apiaceae</i>	Bacteria	SST18	Hot water		50°C for 20 minutes				
<i>Avena</i>	Fungi	SST10	1) Carboxin and Thiram OR 2)* Carboxin and Imazalil OR 3) Flutriafol and Imazalil OR 4) Triadimenol and Fuberidazole OR 5) Triadimenol, Imazalil and Fuberidazole OR 6) Tebuconazole and Imazalil		1) 0.8g a.i. and 0.8g a.i./kg. 2)*0.8 g a.i. and 0.05g a.i./kg. 3) 0.05g a.i. and 0.05g a.i./kg. 4) 0.375g a.i. and 0.15g a.i./kg. 5) 0.23g a.i., 0.075g, and 0.15g a.i./kg 6) 0.025g a.i. and 0.05g a.i./kg.			MPI IHS 155.02.05	*Not an option for Avena and Triticum
<i>Camissonia</i>	Fungi	SST13							
<i>Coffea</i>	Fungi	SST13							
<i>Camellia sinensis</i>	Fungi	SST13							
<i>Cannabis sativa</i>	Bacteria and Fungi	SST14 or/and* SST7	Hot water		50°C for 30 minutes OR at 60°C for 10 minutes.			MPI IHS 155.02.05	*depends on IHS option chosen Hot water treatment currently not available in NZ
<i>Carpinus</i>	Fungi	SST13							
<i>Carya</i>	Insects Fungi	SST15 SST13							
<i>Carthamus tinctorius</i>	Fungi	SST17	Iprodione		2.5 g a.i./kg			MPI IHS 155.02.05	

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Coriandrum	Fungi	SST4	1) Benomyl, OR 2) Carbendazim, OR 3) Thiophanate methyl		2.5 g a.i./kg			MPI IHS155.02.05	
Cuminum	Fungi	SST17							
Echinochloa	Fungi	SST7							
Fagus	Fungi	SST13							
Glycine	Fungi	SST5	1) Metalaxyl and captan OR 2) Metalaxyl and thiram		1) 0.7 g a.i. and 0.7g a.i./kg 2) 0.7 g a.i. and 1.0g a.i./kg			MPI IHS 155.02.05	
Helianthus	Fungi	SST5							
Hordeum	Fungi	SST10							
Lithocarpus densiflorus	Fungi	SST13							
Lavandula	Fungi	SST4							
Juglans	Insects	SST15	Methyl bromide	ATM OR 91 kpa	32 g/m ³ OR 16 g/m ³ 48 g/m ³ OR 48 g/m ³	15-21 21+ 15-21 21+	12hrs 12hrs 1.5hrs 1hr	MPI IHS 155.02.05	
Macadamia	Insects	SST15							
Myrtaceae	Fungi	SST18	1) Azoxystrobin, OR 2) Triadimenol, OR 3) Mancozeb OR 4) Triforine OR 5) Tebuconazole		maximum label rate			MPI IHS 155.02.05	A copy of the label must be presented with the import documents
<i>Nicotiana tabacum</i>	Fungi	SST5							
<i>Oxyria</i>	Fungi	SST7							

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
<i>Panicum</i>	Fungi	SST7							
<i>Phaseolus</i>	Fungi	SST12	1) Metalaxyl-M, Fludioxonil and Cymoxanil, OR 2) Fosetyl aluminium, Thiram and Thiabendazole, OR 3) Metalaxyl or Mefenoxam, and Captan OR 4) Metalaxyl or Mefenoxam, Captan and Thiram OR 5) Metalaxyl or Mefenoxam, Captan and Fludioxonil		1) 0.35 g a.i, 0.1g a.i and 0.2g a.i/kg; 2) 1.53 g a.i, 0.5g a.i and 0.37g a.i/kg; 3) maximum label rate * 4) maximum label rate * 5) maximum label rate*		MPI IHS 155.02.05		*A copy of the label must be presented with the import documents
<i>Pinus</i>	Fungi	SST13							
<i>Pisum</i>	Insects	SST16	MeBr		16 g/m ³ 24 g/m ³	20+ 10-19	24 24	FAO 79	
	And Fungi	And SST12	Or Phosphine		2 g/m ³	10 -15 16 - 20 21 - 25 26+ (max 35)	14 days 13 days 12 days 11 days	MPI 2016	One day can be subtracted if bottled or generated phosphine gas is used. Note 19
<i>Pseudotsuga menziesii</i>	Fungi	SST13							
<i>Quercus</i>	Insects	SST15							
<i>Sorghum</i>	Fungi	SST7							
<i>Sesamum</i>	Fungi	SST17							
<i>Trigonella foenum-graecum</i>	Fungi	SST4							
<i>Triticum</i>	Fungi	SST10							

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Vicia	Fungi	SST11	1)Metalaxyl-M, Fludioxonil and Cymoxanil, OR 2) Fosetyl aluminium, Thiram and Thiabendazole		1) 0.35 g a.i, 0.1g a.i and 0.2g a.i/kg; 2) 1.53 g a.i, 0.5g a.i and 0.37g a.i./kg			MPI IHS 155.02.05	
Zea mays	Fungi	SST8	1) Carboxin and Thiram. OR 2) Carboxin and Captan. OR 3) Fludioxonil and Metalaxyl OR 4) Imazalil and Triadimenol. OR 5) Imazalil and Flutriafol OR 6) Difenconazole and Mefenoxam OR 7) Fludioxonil and Mefenoxam		1) 0.8 g a.i. and 0.8g a.i./kg; 2) 0.8 g a.i. and 0.7g a.i./kg; 3) 0.025g a.i. and 0.02g a.i./kg; 4) 0.08 g a.i. and 0.22g a.i./kg; 5) 0.08 g a.i. and 0.08g a.i./kg; 6) 0.12 g a.i and 0.01g a.i./kg; 7) 0.025 g a.i. and 0.01g a.i./kg.			MPI IHS 155.02.05	
Seeds for destruction									
	Devitalisation of seeds (including contaminant seeds) and Fungi	SST6	Heat			121 100	15 mins 30 mins	TFGen	To destroy viability and kill fungi
				40% RH (min)		85	15 hrs	FAO 50	
	Devitalisation of seeds	SPT10	Grinding or milling						No whole seeds remaining
<p>Note: all fungicide mixes are calculated on the active ingredient per kilogram of seed.</p> <p>Note 19: When fumigating seeds packed in airtight bags, the bags need to be perforated or opened to allow for gas distribution.</p>									

1.12 Vehicles, Machinery, Containers, Parts, Tyres, Equipment (not used with animals) etc.

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Temp. °C	Time	Source	Comments
Any commodity/product	Snails (not Giant African or Mediterranean snails)	VCE1	Heat Or: MeBr		60	10 mins	MPI	Only use on heat tolerant commodities.
				Atm 48 g/m ³ 40 g/m ³	10-15 16-21+	24h	MPI	
Any commodity/product	Snails: Giant African (<i>A. fulica</i>) or Mediterranean snails (<i>Cernuella virgata</i> & <i>Cochicella acuta</i>)	VCE2	Heat	Atm	65	10min	Brown/MP I unpublishe d	Only use on tolerant commodities.
			Or: MeBr	Atm 118g/m ³ 105g/m ³ 86g/m ³	10-15 16-20 21-25	24 hrs	Cassell's et al 1994	Only use on tolerant commodities.
			Or: HCN	Atm 48 g/m ³	10 +	24 hrs	FAO 50	
Asbestos (Used)	Hitchhikers	VCE2						To be covered
Batteries (used)	Hitchhikers including reptiles	VCE8	MeBr	Atm 80g/m ³ 40g/m ³	10-16 16+	4hrs 4hrs	MPI	Knockdown insecticide required. Fan 20 minutes at start of fumigation. Note: This fumigation rate does not treat associated wood packaging, use ISPM 15
			Or Phosphine	Atm 3 g/m ³	10-30	48hrs		
			Or Heat	Atm	56	30 min		
Cullet (broken or whole glass for recycling) non Gas countries	Hitchhikers	VCE1					MPI	

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Temp. °C	Time	Source	Comments
Cullet (broken or whole glass for recycling) GAS Countries	Hitchhikers	VCE2					MPI	
Material permitted to enter NZ for destruction or disposal (Asbestos)	Insects & Hitchhikers	VCE2					MPI	
Paper for recycling	Insects & Hitchhikers	VCE1a						Heat option not available for this commodity.
Scrap metal non GAS countries	Insects & Hitchhikers	VCE1a					MPI	
Scrap metal GAS countries	Snails - Giant African or Mediterranean	VCE2					MPI	
Shipping & Air containers BMSB see VCE1d	Insects, Spiders incl. <i>Latrodectus</i> spp. (also see VCE1b & c)	VCE1	HT Or: MeBr		56 60	30 mins 10 mins	MPI	For containerised goods, an approved knockdown insecticide must be applied by the fumigator as soon as the container door is open. 20 minutes fan circulation. See Notes 20, 21, 22, 23, 24, 26 below.
				40 g/m³ 48 g/m³	16-21+ 10-15	24 hrs	CFIA	
	<i>Demestidae</i> and <i>Trogoderma</i> spp.	VCE1a	HT Or: MeBr		65	10 mins	MPI Vehicle Risk Analysis.	
				56 g/m³ 64 g/m³ 72 g/m³	21+ 16 - 20 10 –15	24 hrs		
	Spiders (non <i>Latrodectus</i> spp)	VCE1b	Synthetic pyrethroid (e.g. Pyrethroid, Permethrin Or Cypermethrin)	As per maximum label rate e.g. Pestigas 50g/100m³	10+	6 hrs	DAWR <i>Arhopalus</i> sp. rate	

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Temp. °C	Time	Source	Comments
	Spiders (incl <i>Latrodectus</i> spp) and ants	VCE1c	Ethyl Formate 16.7% + 83.3% CO2 (*Vapormate™)	390g*/m ³ 450g*/m ³ 510g*/m ³	21+ 16 - 20 10 - 15	4 hrs	MPI Technical Advice 2014	Gas input temperature >60°C, time starts when equilibrium reached between top, middle bottom readings, 30% end point reading required
	Snails	VCE1a						
	Snails - Giant African or Mediterranean	VCE2						
Tents, footwear, golf bags, misc equipment, Tapa cloth etc	Insects except <i>Trogoderma</i> spp.	SPT1						
Tyres – not on rims & used parts	Insects	VCE1					Ritchie 2001	If heat is used monitor water temperature in a tyre
Vehicles, machines, parts, misc equipment etc	Insects Pet hair BMSB see VCEd	VCE1	Heat Or: MeBr	32g/m ³ 40 g/m ³ 48 g/m ³	56 60 60 21+ 16-21 10-15	30 min 10 min 20 min 24 hrs		All sizes <3tonne >3tonne 30% end point g/m ³
	<i>Demestidae</i> , <i>Trogoderma</i> spp & snails	VCE1a						
	Snails - Giant African or Mediterranean	VCE2						

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Temp. °C	Time	Source	Comments
	Spiders (incl Latrodectus spp)	VCE1c or VCE1						
Containers, Vehicles, machinery, parts, misc equipment etc.	Stink bugs e.g. Brown Marmorated Stink Bug (<i>Halyomorpha halys</i>), Yellow Spotted Stink Bug (<i>Erthesina fullo</i>)	VCE1d	Heat		56 60	30 min 10 min	ISPM 15	All sizes or <3tonne The coldest surface of the goods temperature in the hardest to heat area
			or					
			Methyl bromide	- achieve a CT of 200 g.h/m³ or more with a dose of 24g/m³ at 10°C and above for 12 hours (but less than 24 hour) with a minimum final reading of at least 12 g/m³ (50%) or ; - achieve a CT of 200 g.h/m³ or more with a dose of 24g/m³ at 10°C and above for 24 hours or longer with a minimum end point reading of 8 g/m³ (30%).				Note 26. MPI 2018 CTO20180017
			or					
			Sulfuryl fluoride	- a dose of 24 g/m3 or above, at 10°C or above, for 12 hours (but less than 24 hours), with a minimum end point concentration of 12 g/m³ (50%) or ; - a dose of 24 g/m3 or above, at 10°C or above, for 24 hours or longer, with a minimum end point concentration of 8g/m³ (33%) or ; - achieve a CT of 200 g.h/m³ at 10°C or above, for 12 hours (but less than 24 hours), with a minimum end point concentration of 12 g/m3 (50%)* or ; - achieve a CT of 200 g.h/m³ or more at 10°C or above, for 24 hours or longer, with a minimum end point concentration of 8g/m³ (33%)*.				Note 25, 26. *Fumiguide or Fumicalc method

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage	Temp. °C	Time	Source	Comments
Aircraft and water craft	Stink bugs e.g. Brown Marmorated (<i>Halyomorpha halys</i>), Yellow Spotted Stink Bug (<i>Erthesina fullo</i>)	VCE1e	Insecticide Or VCE1d	Bifenthrin, Cyphenothrin, Esfenvalerate, Permethrin or Silaflluofen (residual insecticides) As per maximum label rate			MPI 2018	All compartments where stink bugs may hide must be opened before fogging or spraying. Note: VCE1d used at owners risk
<p>Note 20: Warning: It is advisable to use heat or sulfuryl fluoride treatment option instead of MeBr when treating vehicles with rubber, leather seats and other sulphur containing components, due to a possibility of tainting post fumigation. Methyl bromide information sheet</p> <p>Note 21: Motor homes & caravans if fumigated must use the lowest rate at 16-21°C, and vented with fans for minimum 2 hrs with all cupboards open. Some materials can be affected by methyl bromide, check: Methyl bromide information sheet</p> <p>Note 22: Where containers are being treated for ants then the container must be covered and treated with doors open.</p> <p>Note 23: All plank floored containers must be covered for fumigation.</p> <p>Note 24: When heat is used all cavities of the vehicle to achieve temperature & continuous fan for duration. At least one sensor must be inserted in the carpet layer if present, for a container it is the door seal and for scrap metal includes the surface temp of the largest accessible piece away from heat input.</p> <p>Note 25: Sulfuryl fluoride not registered in NZ, this rate will not kill eggs nor spiders. Ct g.h/m³ is the concentration over time sum</p> <p>Note 26: For containerised goods for on arrival treatment, an approved knockdown insecticide must be applied by the fumigator as soon as the container door is open.</p>								
Vehicles, machines, parts, tyres, containers, tents, footwear, golf bags, misc. equipment etc.	Soil, leaves, needles seeds etc.	VCE 9	Decontaminate by sweeping and/or washing off. For soil contamination, the product is to be washed and disinfectant only needed when animal residue detected. Contaminates to be collected and destroyed in an approved manner					Shoes, boots, sports footwear and equipment with soil do not normally need disinfecting unless animal residue detected.
Vehicles, machines, parts, tyres, containers, footwear, misc. equipment etc.	Contaminated with animal, products such as blood or faeces	EAP5						Contaminates to be removed prior to disinfecting. Contaminates to be destroyed in an approved manner
Vehicles, Trucks, Utilities and Containers with wooden decking	Fungi in wooden decking	VCE5	Sodium hypochlorite solution (NaOCl)	200ml of 31.5 g/l a.i. NaOCl in 1 litre water		20 mins	MPI	Steam clean decking first if dirty, then liberally apply treatment

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Dosage		Temp. °C	Time	Source	Comments
	(Refer to Note 27 for wood/ fungal rots)		Didecyl dimethyl ammonium chloride (e.g. Wet & Forget)	200ml of 99g/l DDACl in 1 L water			20 mins	MPI	Steam clean decking first if dirty, and then liberally apply treatment.
		FPT4	HT						See page 16, and Note 3 .
Winches, wire or fibre ropes or cables for agricultural and forestry machinery	Soil, fungal spores, insects, seeds, etc	VCE7	HT or:			70	4 hrs	MPI	
			HT			121	15 min		
Note 27: If decayed portions of decking or cross members are observed, the wood must be removed and destroyed by incineration or by another approved method.									

1.13 Soil

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Soil, less than 10kg	Micro-organisms including insects, bacteria, fungi etc	SOT1	HT OR Irradiation	40% RH (min)	50 kGy	100 OR 85	25 mins 15 hrs	MPI.STD. SOWTR	Soil must be moist during HT
Peat	Micro-organisms including insects, bacteria, fungi etc	SOT2	Autoclave Or: HT	Pres:100 kPa		120 85	30 mins 15 hrs	MPI.STD. FERTGRO	
Soil	Contaminant on products or items not used for human consumption	SOT 3	The soil must be removed for destruction by incineration or any other approved method. The product to be washed and disinfectant only needed when animal residue detected.						Shoes, boots, sports footwear and equipment do not normally need disinfecting unless animal residue detected.

1.14 Vessels or Floating Structures

Commodity/Product	Reason for Treatment	Short code	Treatment/ Chemical Pressure/ Humidity	Dosage	Time	Source	Comments
Marine-going boats or other craft (barges, hovercraft, floating drilling rigs etc.)	Biofouling on <u>external hull areas</u>	BIOF1	In-water cleaning by mechanical or manual methods: all visible biofouling is removed from the cleaned area or rendered non-viable (not capable of living and developing to reproductive maturity). All biological material $\leq 12.5 \mu\text{m}$ particle size must be captured or rendered non-viable. Note 28 ; Or Shrouding (enclosure or encapsulation) of vessel within water barrier material, isolating craft from surrounding environment: All biofouling in the treated area must be rendered non-viable (not capable of living and developing to reproductive maturity). Note 28			MPI 2016, MORRISEY 2015	Note: there are currently no approved providers of these treatments.
Marine-going boats or other craft (barges, hovercraft, floating drilling rigs etc.)	Biofouling in <u>internal niche areas</u> (sea chests, pipework, etc.)	BIOF2					
Ballast water sediment	Marine larvae, propagules, cysts, etc.	MAR1	Disposed of to a landfill that has no drainage to the sea directly or indirectly.				
<p>Note 28: No release to the marine environment unless filtered to $\leq 12.5 \mu\text{m}$ or treated to render biological material non-viable. No material dislodgement of $> 0.5 \text{ cm}$ in diameter during system mobilisation, operation or demobilisation (e.g., by divers, hoses or system). Other residues to be buried in a landfill in accordance with regional government requirements.</p> <p>Note 29: Organisms may be rendered non-viable when body structures are broken, missing or decomposing; feeding/movement cannot be observed and organisms are unresponsive/no respiration currents can be observed. The efficacy of these shrouding treatments in achieving this must be established prior to treatment use.</p>							

1.15 Water

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pressure/ Humidity	Dosage	Temp. °C	Time	Source	Comments
Water as contaminant or if imported up to 100L	Micro- organisms including mosquito life stages	WAT1	Boiling			100	1 min	MPI STD; BMG-STD-SOWTR	
			Calcium hypochlorite		20 mg/L		Agitate for 1 min then let sit for 30 mins	MPI STD; BMG-STD-SOWTR	
	Mosquito larvae	WAT2	BTI (<i>Bacillus thuringiensis israelensis</i>) larvicide	Liquid concentrate Briquettes	50/50 with water 1 per 12m ²		24 hrs	Ministry of Health	Spray for complete coverage of the water or receptacle surface. See Note 31 below
Note 30: Contact MOH when mosquitoes are found and discuss appropriate treatments and rates. Adult mosquitoes may be exterminated by utilising synthetic pyrethroids applied as contact insecticides, aerosols or by thermal fogging.									

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pool Chlorine/ Bleach Humidity	Active Ingredient	Water Volume	Concentration	Source	Comments
Pooled water on used machinery etc. Large receptacles, surface treatment after draining water	Insects including mosquitoes completing lifecycle in water, and especially unhatched eggs at or below the waterline	WAT3	Granular pool chlorine (650 g/kg calcium hypochlorite)	1 kg	650 g	65 L	1 %	New Zealand Ministry of Health	Pooled water must be drained treated and the cavity treated with 1% solution of any of the chlorination solutions mentioned. Solution must be sprayed onto surfaces including tide marks to the point of runoff such that the solution stays in place for at least 5 seconds. Where fumigation occurs after draining spraying is not required.
				15.4 g	10 g	1 L	1 %		
				77 g	50 g	5 L	1 %		
				154 g	100 g	10 L	1 %		
			Granular pool chlorine (700 g/kg calcium hypochlorite)	1 kg	700 g	70 L	1 %		
				14.3 g	10 g	1 L	1%		
				71.5 g	50 g	5 L	1 %		
				143 g	100 g	10 L	1 %		
			Liquid pool chlorine (150 g/kg benzalkonium chloride)	1 kg ≈ 1 L	150 g	15 L	1 %		
				66.7g ≈ 66.7ml	10 g	1 L	1 %		
				335 g ≈ 334 ml	50 g	5 L	1 %		
				667 g ≈ 667 ml	100 g	10 L	1 %		
			Liquid bleach (4 % sodium hypochlorite)	1 L	4 %	4 L	1 %		
				250 mL	4 %	1 L	1 %		
				1.25 L	4 %	5 L	1 %		
				2.5 L	4 %	10 L	1 %		
Note 31: Chemical toilets in caravans and motor homes do not require treatment									
Pooled water including tide marks on used machinery etc.	Insects including mosquitoes completing	WAT4	Granular pool chlorine (650 g/kg calcium hypochlorite)	100 g	65 g	20 L	0.33 %	New Zealand Ministry of Health& Australian	Where draining of pooled water is not readily possible; treatment must be done by filling the
				50 g	32.5 g	10 L	0.33%		
				500 g	325 g	100 L	0.33%		
				100 g	70 g	20 L	0.35 %		

Commodity/ Product	Reason for Treatment	Short code	Treatment/ Chemical	Pool Chlorine/ Bleach Humidity	Active Ingredient	Water Volume	Concentration	Source	Comments
Small receptacles including those with tide marks, especially with difficult access e.g. semi-sealed drums	lifecycle in water		Granular pool chlorine (700 g/kg calcium hypochlorite)	50 g	35 g	10 L	0.35 %	Mosquito Manual 2002	receptacle to the point of overflow with chlorination solution of 0.3 to 0.35 % chlorine. The solution must be in place for at least 30 minutes and then emptied on the same day after treatment.
				500 g	350 g	100 L	0.35 %		
			Liquid pool chlorine (150 g/kg benzalkonium chloride)	100 g ≈ 100 ml	15 g	5 L	0.30 %		
				200 g ≈ 200 ml	30 g	10 L	0.30 %		
				2 kg ≈ 2 L	300 g	100 L	0.30 %		
			Liquid bleach (4 % sodium hypochlorite)	100 ml	4 %	1.2 L	0.33 %		Generally used for small receptacles up to 200L (volume) and includes those with a “tide mark”. Warning signs must be placed on the treated receptacles until emptied.
				833 ml	4 %	10 L	0.33 %		
				8.33 L	4 %	100 L	0.33 %		

Appendix 1: Amendment Record and Implementation Schedule

Amendments to this standard originally issued on 5 December 2007 will be given a consecutive number and will be dated. Amendments for 2009, 2010 and 2012 have been placed in a separate document and placed on the treatments webpage.

Please ensure that all amendments are inserted and obsolete pages removed.

Date: 22/07/19 Amendment No: 12		
Page/Code	What has Changed	Implementation Date
Pg 33,34,37	Seeds sectioned into interception, Part 2 of the IHS and destruction	When published
Pg 38	Asbestos - required to be covered as per IHS	
Pg 41	VCE1d - updated wording to align with Department of Agriculture including removing 60C for 20mins >3,000kg.	
Pg 43 VCE1e	Changed wording to watercraft to match the Vehicle IHS. Note 20 and 21, added link to methyl bromide information sheet	

Date: 26/11/18 Amendment No: 11		
Page/Code	What has Changed	Implementation Date
Pg 8 IAP8	Note added on insect treatment	When published
Pg 11	Note added on insect treatment	
Pg 37 SST6	Added TFGen sterilisation temperature and time	
Pg 41, VCE1d	New BMSB treatment dosage for methyl bromide and sulfuryl fluoride added to meet the C:t value	
Pg 41, VCE1e	Esfenvalerate added, VCE1d added as an option	

Date: 9/08/18 Amendment No: 10		
Page/Code	What has Changed	Implementation Date
Pg 41, VCE1d	New BMSB treatments for methyl bromide and sulfuryl fluoride. Note 25 Ct added	When published
Pg 41, note 26	Added for all containers insecticide spray on door opening	
Pg 42-48	Updated Note numbering due to adding new 26.	
Pg 51	Ct definition added	

Date: 12/07/18 Amendment No: 9		
Page/Code	What has Changed	Implementation Date
Pg 7, IAP2	Added SPT1	When published
Pg 35, SST18	Added Myrtaceae seed treatment	

Date: 20/04/18		Amendment No: 8	
Page	Code	What has Changed	Implementation Date
various		Corrected Note 18 to Note 22 for reference to ants	When published
27		Added two species of snail reference to VCE2	
31		Added two species of snail reference to VCE2 and updated comment on treatment effect	
36	SST16	Moved the columns to match heading correctly	

Date: 4/04/18		Amendment No: 7	
Page	Code	What has Changed	Implementation Date
various		Corrected Note 18 to Note 22 for reference to ants	When published
30	FVT8	Removed double entry for Grapes from Australia Chile and USA	
34	SST10	Was SS10 corrected to SST10	
34	SST18	SST18 corrected typo error from 30 to 20 minutes	

Date: 17/11/17		Amendment No: 6	
Page	Code	What has Changed	Implementation Date
1-3		Formatted to the new MPI technical document format.	When published
4		Comment added on pre-shipment treatment and official methyl bromide use.	
4		Added a comment on the time that it can take for a pest to die after treatment or be alive and infertile such as irradiation	
4		Added reference to ISPM 28 for submitting a treatment to MPI for approval	
6		Clarified possible treatment providers comment regarding baiting for rodents on aircraft	
7,8,9		Clarification of wording around formalin v formaldehyde, potassium permanganate and measuring units.	
7-9	IAP3,6,7	Animal products – updated treatments	
11		Animal bedding treatment removed.	
12		Changes to wording regarding reason for treatment for used equipment.	
13		Added VCE1a as an option	
14	FPT1	Added freezing as an option	
15	FPT4	Improved note on humidity, items with fully painted surfaces cannot be fumigated and added reference to ISPM 15	

15	FPT4	Updated as per CTO 20170022 for temperature range and times, improved note on humidity and added reference to ISPM 15, comment added on painted surfaces	
17	FPT4	Removed 200mm from comments, humidity note added, removed FPT7 and replaced with FPT4, added a sleepers category. Added heat treatment option for wooden decking of trucks	
17	FPT5	Added FPT4 to bamboo for pathogens	
18	SPT1&2	Added active ingredient to be used comment and added a freezing option to SPT2	
19	Note 6	Replaced reference to NZFSA with MPI Food Safety	
20	SPT11	Added SPT1 for bags of all sizes for beans	
22	NST1	Added application rate for dimethoate, esfenvalerate & spinosad	
23	NST6	Added spiders to NST6, corrected spelling, added rates for dichlofos and dimethoate, added a note for the care of fumigating live plants	
25	NST7	Corrected chemical name, corrected rate for fenamiphos, NST7 updated a.i. removed	
29	FVT1 or NST6	Added slug treatment for fresh flowers and foliage	
29	FNS9	Changed a.i. from % to grams, altered wording on viability & removed reference to old MPI standard	
30	FVT1a	Changed reference from specific fruits to stone fruit, insects as a reason and added another temperature rate, FVT1b added for grapes & plums from Chile as per IHS, separated out USA grapes as different temperature, noted that SO2 treatment for spiders as not available in NZ.	
30	FVT8	Added spider treatment for pomegranates	
32	FVT9	Added slugs and worms to FVT9 and referenced APHIS treatment schedule as the source	
34-37	SST7-18	Added Seed treatments from IHS. Updated the pea treatment with phosphine for longer. SST18 corrected typo error from 30 to 20 minutes	Pea treatment: when the revised IHS is signed off
39	VCE1b	Removed pybuthrin 33 from VCE1b, added tapa cloth, and removed reference to VCE4. Added VCE1c.	
40	VCE1c	Ethyl formate for Spiders (incl Latrodectus spp) and ants added	
40	VCE1	Added 60C for 20 minutes for vehicles 3,000kg and above	
41	VCEd	Added treatment of vehicles and machinery for BMSB	When the revised IHS is signed off.
42	VCE7	Removed reference to old MPI standard	

43	SOT1	SOT1 - Added irradiation	
43	SOT2	Referenced FERTGRO IHS	
44	BIOF 1 & 2, MAR1	Added BIOF1, BIOF2 and MAR1	
51		Added link to FAO treatment manual	

Appendix 2: Definitions

a.i.	Active ingredient
Atm	Under normal atmospheric pressure
BACC	Biosecurity Authority Clearance Certificate
Biosecurity contaminant(s):	Any organic material, thing or substance that (by reasons of its nature, origin or other relevant factor) it is reasonable to suspect harbours or contains a regulated pest (or parts thereof) and where such organic material/thing/substance is not intended for biosecurity clearance under the Act.
BORIC	Biosecurity Organisms Register for Imported Commodities
°C	Degrees Celsius. Where temperatures are given, measure actual rates with Swedish rounding, e.g. 12.4°C = 12°C; 12.5°C = 13°C.
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora. http://www.cites.org/
CO ₂	Carbon dioxide
Ct	Is expressed as g.hr/m ³ or grams x hours per m ³ = the sum of the fumigant concentration readings over time. E.g. 20g/m ³ x 10 hours = 200g.h/m ³ CT can be estimated using the following calculation:

$$CT_{n,n+1} = (T_{n+1} - T_n) \times \sqrt{C_n \times C_{n+1}}$$

Where	T_n is the time the first reading was taken, in hours
	T_{n+1} is the time the second reading was taken, in hours
	C_n is the concentration reading at T_n , in g/m ³
	C_{n+1} is the concentration reading at T_{n+1} , in g/m ³
	$CT_{n,n+1}$ is the calculated CT between T_n and T_{n+1} , in g.h/m ³

e.g. 20g/m³ @ 0 hour, 14g/m³ @ 12 hours; 200g.h/m³ = 14 - 0 x SQR (20x14)

Deep burial	Buried under a minimum of two metres compacted fill at a commercial landfill, requires a CTO direction.
Disinfectant	Any of the MPI approved disinfectants; refer - http://www.biosecurity.govt.nz/files/regs/stds/MPI-approved-disinfectants.pdf
DOC	Department of Conservation
ECO2 Fume	Phosphine with carbon dioxide as a carrier gas
FAO 50	International Plant Quarantine Treatment Manual; FAO Plant Production and Protection Paper 50, Food and Agriculture Organisation of the United Nations, Rome. Editors: J F Karpati, C Y Schotman & K A Zammarano. 1983.
FAO 79	Manual of Fumigation for Insect Control; FAO Agricultural Studies No. 79, Food and Agriculture Organization of the United Nations, Rome 1969. By H A U Monro. 1969. http://www.fao.org/docrep/X5042E/x5042E00.htm#Contents
Formalin	Formalin fumigation: (37% formaldehyde solution)
g	Grams
g/L	Grams per litre
g/kg	Grams per kilogram

g/m ³	Grams of active ingredient per cubic metre
GAS	giant African snail
hr	Hour/Hours
HCN	Hydrogen cyanide fumigation (trade name Cyanosil)
HT	Heat treatment
IHS	Import Health Standard, Biosecurity Act 1993
Inspector	As per the Biosecurity Act 1993
Irradiation	Any consignments to be irradiated are subject to approval and acceptance by Schering Plough Animal Health Ltd. Items must be packaged so that they fit into a container with the dimensions 384mm x 600mm x 276mm and weigh no more than 8kg.
ISPM15	International Standards for Phytosanitary Measures, publication No. 15, Guidelines for regulating wood packaging material in international trade: https://www.ippc.int/core-activities/standards-setting/ispm15
ISPM 28	Phytosanitary Treatments for Regulated pests: https://www.ippc.int/core-activities/standards-setting/ispm28
kg	Kilogram
kGy	Kilogray, a metric unit for measuring radiation
kPa	Kilopascal, a metric unit for measuring pressure above or below atmospheric; 1 kPa = 0.1450 psi
MPI STD	Ministry for Primary Industries
MeBr	Methyl bromide
min	Minutes
MOH	Ministry of Health
Pestigas	Pestigas is synergised pyrethrum with carbon dioxide as a carrier gas.
ppm a.i./m ³	Parts per million active ingredient per cubic metre
ppm	Parts per million
Pres	Under positive pressure
Risk goods	Means any organism, organic material, or other thing, or substance, that (by reason of its nature, origin, or other relevant factors) it is reasonable to suspect constitutes, harbours, or contains an organism that may: a) Cause unwanted harm to natural and physical resources or human health in New Zealand; or b) Interfere with the diagnosis, management, or treatment, in New Zealand, of pests or unwanted organisms.
RH	Relative humidity
Short Code	EAP - Equipment Animal Products page 10
	FNS - Flowers and Foliage page 27
	FPT - Forest Produce Treatment page 14
	FVT - Fruit and Vegetable Treatments page 27
	IAP - Inedible Animal Products page 7
	NST - Nursery Stock Treatment page 22
	PPT - Plant Products page 21
	SOL - Soil page 43
	SPT - Stored Product Treatment page 18
	SST - Seeds Treatment page 33

	VCE - Vehicles Containers Equipment	page 38
	WAT - Water	page 45
SO ₂	Sulphur dioxide	
TF	Transitional Facility	
Vac	Under partial vacuum	