

# Methyl bromide fumigation methodology comparison table



Comparison between the Methyl bromide fumigation methodology version 2.0 and Methyl bromide fumigation methodology version 3.0.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>Purpose</b>	Purpose	<p>This methodology sets out the minimum requirements for treatment providers performing methyl bromide fumigations on commodities 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 QPS treatments with methyl bromide. 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.</p> <p>Fumigation treatment providers registering to perform treatments in accordance with these requirements must have the equipment, facilities, accredited fumigators and management and administrative procedures necessary to ensure that all relevant treatments comply with these requirements.</p> <p>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.</p> <p>Methyl bromide is listed as a category 1 ozone depleting substance under the Montreal Protocol 1992. Performing methyl bromide fumigations in accordance with these requirements will reduce the use of methyl bromide by minimising the need for re-treatment of consignments due to ineffective fumigations caused by poor fumigation practices.</p>	<p>This methodology sets out the minimum requirements for treatment providers performing methyl bromide fumigations on import and export consignments for Quarantine and Pre-Shipment (QPS) purposes. Compliance auditing of treatment providers is performed against the requirements in this methodology to gain assurance QPS treatments are performed effectively.</p> <p>Treatment providers required to perform fumigations in accordance with this methodology must have the:</p> <ul style="list-style-type: none"> <li>• equipment</li> <li>• facilities</li> <li>• personnel and</li> <li>• administrative procedures necessary to comply with these requirements.</li> </ul> <p>Importing jurisdictions may impose more stringent treatment requirements to address their individual biosecurity risks. In such cases, those additional requirements, referred to in this document as import conditions, take precedence over the requirements of this methodology and must be complied with to the satisfaction of the relevant authority of the importing jurisdiction.</p>	Changed for clarity and to reflect the purpose rather than being informative text.
<b>Scope</b>		<p>This document applies to commercial and government treatment providers performing QPS methyl bromide fumigation treatments for countries that have adopted a specific methyl bromide treatment schedule.</p> <p>This document is not intended to specifically cover the performance of methyl bromide fumigation treatments under ISPM 15. However, the basic principles, requirements and recommendations described in this document and the associated guideline are still generally applicable.</p> <p>Even though the basic principles and requirements would be relevant this document is not intended to specifically cover fumigations of vessels (whether it is the vessel itself or its cargo) silos or other storage facilities, buildings or other fumigations that are not done in the types of enclosure described herein and not related to import or export.</p>	<p>All requirements in this methodology must be performed to ensure:</p> <ul style="list-style-type: none"> <li>• target pests are killed</li> <li>• the people performing the treatment remain safe and are not harmed</li> <li>• all people in the area around the treatment area remain safe and are not harmed</li> <li>• the goods or commodity being treated are not damaged or adversely affected.</li> </ul> <p>Methyl bromide is listed as a category 1 ozone depleting substance under the Montreal Protocol 1992. Performing methyl bromide fumigations in accordance with these requirements will reduce the use of methyl bromide by minimising the need for re-treatment of consignments due to ineffective fumigations caused by poor fumigation practices.</p> <p>Use and handling of methyl bromide must not contravene any instructions on the product label, safety data sheet, local regulations or relevant licence requirements.</p>	Principles of scope moved to "Purpose". Heading changed to "General" to align with newer methodologies and to be more relevant to the content of this section.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>How to use this document</b>	How to use this document	Some of the requirements in this methodology only apply in certain circumstances, generally related to the type of enclosure used or fumigating perishables. It is important for the fumigators and compliance auditors to understand the purpose of the requirements and the outcomes they are intended to achieve and the particular circumstances in which they apply. This document should be read in conjunction with the Guide to performing QPS fumigations with methyl bromide, which provides information on how to meet these requirements in commonly encountered situations.	This document outlines the minimum set of requirements for performing methyl bromide fumigations treatments. The Guide to performing QPS fumigations with methyl bromide and Guide to packaging suitability for performing QPS treatments provide information that may assist in meeting these requirements in commonly encountered situations. It is important treatment providers and compliance auditors understand the purpose of the requirements of this methodology, 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. For all terms not defined in the glossary, refer to the definition used by the Macquarie Dictionary	Changed for clarity.
<b>Prior to Fumigation</b>	<b>1.1</b> Target of the fumigation	<b>1.1.1</b> The fumigator must know what the target of the fumigation is. <b>1.1.2</b> The target of the fumigation must be recorded on the fumigation documentation.	<i>Moved to section 1.1 Fumigation personnel and 3.1 Target of fumigation.</i> <b>1.1.1</b> The fumigator-in-charge must ensure the requirements of this methodology are complied with. <b>1.1.2</b> The fumigator-in-charge must comply with the treatment schedule, as set by the relevant authority, for the goods being treated. <b>3.1.1</b> The fumigator must record the target of fumigation on the record of fumigation (see section 12 Documentation).	Order of the document amended to reflect the workflow of the fumigation more closely.
<b>Prior to Fumigation</b>	<b>1.2</b> Consignment suitability	<b>1.2.1</b> The fumigator must determine if the consignment is suitable for fumigation with methyl bromide.	<i>Moved to section 3.1 Target of fumigation.</i> <b>Note:</b> The fumigator-in-charge must determine if the consignment and target of fumigation is suitable for fumigation with methyl bromide. To be considered suitable, consignments must meet the requirements of section 3 Consignment suitability	Clause was not an enforceable condition, changed to note to provide context.
<b>Prior to Fumigation</b>	<b>1.2</b> Consignment suitability	<b>1.2.2</b> If the consignment does not conform to the suitability requirements remedial action must be taken or an alternative acceptable treatment method used.	<i>Moved to section 3.1 Target of fumigation.</i> <b>3.1.2</b> If the consignment is not suitable for fumigation, remedial action must be taken to make the consignment suitable prior to fumigation. If the consignment cannot be made suitable, the consignment must not be fumigated with methyl bromide. <b>3.1.3</b> If the target of fumigation includes the exterior of a sea container, the fumigation must be performed as a sheeted enclosure in accordance with section 4.2 Sheeted enclosures or otherwise made suitable for fumigation. <b>3.1.4</b> If the target of fumigation is inside a sea container, and the sea container is not sufficiently gas tight (in accordance with section 4.1 All Enclosures), compliant with section 4.1.1a), the fumigation must be performed as a sheeted enclosure in accordance with section 4.2 Sheeted enclosures or otherwise made suitable for fumigation.	Order of the documented amended to reflect the workflow of the fumigation - ease of use.  Clarified and simplified language to reflect intent of original wording and reduce the subjectivity of the clauses.  Added clauses explaining remedial action for two common conformity issues
<b>Prior to Fumigation</b>	<b>1.3</b> Free Airspace	<b>1.3.1</b> There must be free space throughout the enclosure to allow the fumigant to freely circulate around the target of the fumigation.	<i>Free air space requirements now reflected throughout the document clearer monitoring placement requirements.</i>	Feedback received indicated that the free airspace requirements were hard to interpret, comply with and enforce due to subjective nature of the requirement. Free airspace is needed to conduct a successful fumigation. This is verified through the correct placement of monitoring lines and concentrations are above the standard.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Prior to Fumigation	1.3 Free Airspace	1.3.2 There must be sufficient free airspace to permit the positioning of sampling tubes in appropriate locations within the enclosure. See 4.1 Concentration sampling tubes.	Replaced with clearer gas monitoring location placement requirements.	Feedback received indicated that the free airspace requirements were hard to interpret, comply with and enforce due to subjective nature of the requirement. Free airspace is needed to conduct a successful fumigation. This can be measured if the monitoring lines are placed correctly.
Prior to Fumigation	1.3 Free Airspace	1.3.3 Some treatments may specify a maximum load factor in the enclosure. The volume of commodity must not exceed the specified load factor as a proportion of the enclosure volume and must be stacked so there is sufficient separation between items to allow the fumigant to circulate freely and penetrate easily into boxes, bags or other types of packaging.	Removed.	If there are specific load factors these will be reflected in the import conditions. Import conditions always override the methodology.
Prior to Fumigation	1.3 Free Airspace	1.3.4 For perishable commodities, the following free air space requirements apply unless otherwise stated in the treatment schedule being applied: <ul style="list-style-type: none"> <li>• a maximum load factor of 80%</li> <li>• packages must be placed on pallets or raised off the ground by at least 100mm by other means.</li> </ul>	Moved to section 3.4 Load factor requirements for perishable commodity. <p>3.4.1 Section 3.4 requirements apply to perishable commodities.</p> <p>3.4.2 If the target of the fumigation is a perishable commodity, and the treatment schedule does not specify load factor requirements, the following load factor requirements apply:</p> <p>a) A maximum load factor of 80%.</p> <p>b) Packages must be placed on pallets or raised off the ground by at least 100 mm by other means.</p>	Re-worded for clarity and to specify load factor instead of stating 'free airspace'.
Prior to Fumigation	1.4 Timber thickness and spacing	1.4 Timber thickness and spacing	Moved to section 3.5 Requirements for timber.	Order of the document amended to more closely reflect the workflow of the fumigation - ease of use
Prior to Fumigation	1.4 Timber thickness and spacing	1.4.1 Untreated timber products must have at least one physical dimension which is less than 200 mm thick.	Moved to section 3.5 Requirements for timber. <p>3.5.1 Section 3.5 requirements apply to timber and timber products.</p> <p><b>Note:</b> If the target of fumigation is timber, the methyl bromide must be able to penetrate every part of the timber. The accepted depth that methyl bromide can penetrate into timber is 100 mm from the surface of the timber.</p> <p>3.5.2 If the target of the fumigation is uncoated timber all internal points within the timber must be no greater than 100 mm from a surface of the timber.</p>	Re-worded to ensure the conditions apply to oddly shaped timber. Current requirements only accurately apply to timer that are even thickness and technically timber products could comply with the condition that are not suitable for fumigation.  Note added for clarity.
	1.4 Timber thickness and spacing	1.4.2 Timber and timber product fumigations must be conducted before any surface coating are applied unless all parts of the timber or timber product have at least one uncoated surface and a maximum thickness of 100 mm from the uncoated surface.	Moved to section 3.5 Requirements for timber. <p>3.5.3 If the target of fumigation is timber coated with an impermeable material (as per requirement 3.2.5), to comply with requirement 3.5.2 the timber must:</p> <p>a) have one uncoated surface no more than 100 mm from the coated surface, or</p> <p>b) be fumigated before any impermeable surface coatings are applied.</p>	Re-worded for clarity
Prior to Fumigation	1.4 Timber thickness and spacing	1.4.3 Where timber is the target of the fumigation it must be separated by a minimum of 5 mm of airspace every 200 mm. This separation can be horizontal or vertical.	Moved to section 3.5 Requirements for timber. <p>3.5.4 Individual timber products must be separated by a minimum of 5 mm every 200 mm to create space for fumigant penetration along the entire length of the timber. This separation can be horizontal or vertical.</p>	Re-worded for clarity
Prior to Fumigation	1.5 Impervious wrappings, coatings and surfaces	1.5 Impervious wrappings, coatings and surfaces	Moved to section 3.2 Impermeable packaging, wrappings and surface coatings.	Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Prior to Fumigation	1.5 Impervious wrappings, coatings and surfaces	<b>1.5.1</b> The target of the fumigation must not be coated in materials that will prevent the methyl bromide from penetrating into the target of fumigation such as lacquers, paints, waxes, natural oils, veneers or plastic wraps.	<i>Moved to section 3.2 Impermeable packaging, wrappings and surface coatings.</i> <b>3.2.1</b> The target of fumigation must not be covered by impermeable packaging, wrapping or surface coatings that impede methyl bromide distribution.	Re-worded for clarity
Prior to Fumigation	1.5 Impervious wrappings, coatings and surfaces	<b>1.5.2</b> Impervious wrappings must be removed, opened or slashed prior to fumigation in such a way to allow methyl bromide to come into contact with and, if needed, penetrate into the target of the fumigation.	<i>Moved to section 3.2 Impermeable packaging, wrappings and surface coatings.</i> <b>3.2.2</b> Impermeable packaging and wrappings that impede methyl bromide distribution or impede methyl bromide penetration into the target of fumigation must be removed, opened, slashed or made pervious prior to fumigation in accordance with the specifications set out at 3.2.3 and 3.2.4.	Re-worded for clarity
Prior to Fumigation	1.5 Impervious wrappings, coatings and surfaces	<b>1.5.5</b> Due to the short exposure periods for many perishable commodities, all packaging must be opened or otherwise arranged as follows to allow the fumigant to readily circulate around and into the target of the fumigation: <ul style="list-style-type: none"> <li>• Products that are tightly packed into cartons in plastic sleeves (e.g. Cut flowers) must be loosened within boxes to ensure adequate gas penetration during fumigation.</li> <li>• Polythene type liners or non-perforated liners must be opened at the top.</li> <li>• If open ends of plastic sleeves are packed together in the middle of the carton, the cartons must be re-packed with the open ends be placed towards the sides of the cartons.</li> <li>• Cartons without ventilation holes or with flowers in plastic sleeves obscuring the holes must be stacked with the tops open or with holes punctured in the sides.</li> </ul>	<i>Moved to section 3.3 Requirements for perishable commodity packaging.</i> <b>3.3.1</b> Section 3.3 requirements apply to perishable commodities. <b>Note:</b> If the target of fumigation is in impermeable packaging, the impermeable packaging must be removed, opened or made pervious in accordance with section 3.2 Impermeable packaging, wrappings and surface coatings prior to fumigation. <b>3.3.2</b> Cartons must have holes that allow methyl bromide to distribute into the cartons and reach the target of fumigation. <b>3.3.3</b> To achieve the requirement under 3.3.2, prior to fumigation, all cartons must: <ol style="list-style-type: none"> <li>a) be opened or have lids removed, or</li> <li>b) have holes created in the cartons that allow distribution of methyl bromide into the cartons and reach the target of fumigation (holes may be covered with insect proof mesh).</li> </ol> <b>3.3.4</b> Cartons must be arranged in a way that does not block holes or impede methyl bromide distribution. <b>3.3.5</b> All packaging material associated with consignments must be fumigated in accordance with the treatment schedule specific to the consignment.	New section created for perishable commodity packaging.  Re-worded for clarity.
Prior to Fumigation	1.6 Impervious wrapping perforation requirements	<b>1.6.1</b> Impervious wrappings must have 4 or more holes of 6 mm diameter or 5 or more holes of 5 mm diameter for every 100 mm x 100 mm of surface area. Wrappings with at least 6 pinholes per 10 mm x 10 mm surface area are also acceptable. <b>1.6.2</b> The wrapping must be in a single layer, so the perforations are not blocked by the wrapping overlapping itself	<i>Moved to section 3.2 Impermeable packaging, wrappings and surface coatings.</i> <b>3.2.3</b> To be considered pervious, wrappings must have at least: <ol style="list-style-type: none"> <li>a) 4 holes of 6 mm diameter per 100 mm x 100 mm surface area, or</li> <li>b) 5 holes of 5 mm diameter per 100 mm x 100 mm surface area, or</li> <li>c) 6 pinholes per 10 mm x 10 mm surface area.</li> </ol> <b>3.2.4</b> Pervious wrappings must be in a single layer, so the perforations are not blocked by the wrapping overlapping itself. <b>3.2.5</b> If penetration into the target of fumigation is required, the target of fumigation must not be coated in materials that may impede penetration of methyl bromide into the target of fumigation (for example: lacquers, paints, waxes, natural oils, veneers or plastic wraps).	Re-worded for clarity
Prior to Fumigation	1.7 Site suitability	<b>1.7.1</b> The fumigation site must: <ul style="list-style-type: none"> <li>• have adequate space to establish a risk area around the enclosure</li> <li>• allow for safe ventilation</li> <li>• be flat and even</li> <li>• be well ventilated</li> <li>• have power available, either mains or generator.</li> </ul>	<i>Moved to Section 1.3 Site suitability.</i> <b>1.3.1</b> The fumigation site must: <ol style="list-style-type: none"> <li>a) have adequate space to establish an exclusion zone around the enclosure in accordance with section 5.1 Establish an exclusion zone; and</li> <li>b) allow for safe ventilation; and</li> <li>c) be on a flat and even surface; and</li> <li>d) be well ventilated; and</li> </ol>	Order of the documented amended and reworded to reflect the workflow of the fumigation more closely - ease of use

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<b>e) have power available, either via mains or a generator.</b>	
<b>Safety</b>	New section	New section	<p><i>New section 2.1 Safety considerations.</i></p> <p><b>Note:</b> Local jurisdictions may have safety legislation and regulations that govern the safe performance of a fumigation. The requirements contained in Section 2 may differ from the local laws, the fumigator-in-charge must comply with the laws relevant to where the fumigation is being performed.</p> <p><b>2.1.1</b> If a fumigation is performed in a jurisdiction that does not have legislation or local regulations for the safe performance of a fumigation section 2 Safety applies.</p> <p><b>2.1.2</b> Methyl bromide must be handled in a manner consistent with instructions on the product label, safety data sheet or relevant licence requirements.</p>	Many jurisdictions have laws that regulate the safe handling of chemicals and fumigants and/or work health and safety. The treatment application methodology was not considered the appropriate place for safety requirements where other legislation/regulation applied.
<b>Safety</b>	<b>2.1 Risk assessment</b>	<p><b>2.1 Risk assessment</b></p> <p><b>2.1.1</b> Before commencing any fumigation a risk assessment must be carried out to determine if any hazards are present and evaluate the potential consequences to:</p> <ul style="list-style-type: none"> <li>• fumigation personnel</li> <li>• people in the vicinity</li> <li>• occupants of surrounding buildings.</li> </ul> <p><b>2.1.2</b> Appropriate control measures must be in place to address the hazards identified.</p> <p><b>2.1.3</b> The risks must be reviewed as needed to respond to changing circumstances and the control measures must be adjusted accordingly.</p> <p><b>2.1.4</b> The designated fumigator-in-charge is responsible for the safe conduct of the fumigation.</p>	<p><i>Moved to section 2.2 Risk assessment.</i></p> <p><b>2.2.1</b> Before commencing fumigation, a risk assessment must be carried out to identify the risk of methyl bromide exposure to:</p> <p><b>a)</b> fumigation personnel; and</p> <p><b>b)</b> people in the vicinity; and</p> <p><b>c)</b> occupants of surrounding buildings.</p> <p><b>2.2.2</b> Before commencing fumigation, safety measures must be put in place to address all the risks identified in the risk assessment. These safety measures must minimise the risk of methyl bromide exposure to:</p> <p><b>a)</b> fumigation personnel; and</p> <p><b>b)</b> people in the vicinity; and</p> <p><b>c)</b> occupants of surrounding buildings.</p>	Reworded for clarity, removed subjective clauses.
<b>Safety</b>	<b>2.2 Risk area</b>	<p><b>2.2 Risk area</b></p> <p><b>2.2.1</b> A risk area must be established around the perimeter of the enclosure warning people the fumigation is taking place.</p> <p><b>2.2.2</b> The risk area must be demarcated by a physical barrier for the duration of the fumigation.</p> <p><b>2.2.3</b> The size of the risk area should be set according to the risk but must not be less than:</p> <ul style="list-style-type: none"> <li>• 3 metres from the enclosure outdoors</li> <li>• 6 metres from the enclosure inside a building or structure.</li> </ul> <p><b>2.2.4</b> For fumigations in a chamber, see 3.4 Fumigation chambers, a risk area is not required after the fumigant has been applied provided that the chamber is locked from the time the fumigant is ready to be applied until the fumigant has been ventilated and the concentration verified at or below the TLV–TWA. See 9.1 Threshold limit value—time-weighted average (TLV–TWA). A risk area must still be established according to requirement <b>2.2.3</b> and personal protective equipment must be worn while injecting the fumigant into the chamber to protect the fumigator and others against accidental exposure to the fumigant from a failure in the supply system.</p> <p><b>2.2.5</b> Warning signs must be placed around the enclosure. They must:</p> <ul style="list-style-type: none"> <li>• be large enough to be visible from a reasonable distance</li> <li>• be visible from all angles of approach</li> <li>• display easily understood symbols indicating danger and/or toxic gas is in use</li> <li>• provide contact details of the fumigator</li> </ul>	<p><i>Moved to section 5.1 Establish an exclusion zone.</i></p> <p><b>Note:</b> Local jurisdictions may have safety legislation and regulations that govern the safe performance of a fumigation. The requirements contained in Section 5.1 may differ from the local laws, the fumigator-in-charge must comply with the laws relevant to where the fumigation is being performed.</p> <p><b>5.1.1</b> An exclusion zone must be established around the fumigation enclosure and equipment used for methyl bromide injection.</p> <p><b>5.1.2</b> The exclusion zone must have a physical barrier at all points where the enclosure is accessible.</p> <p><b>5.1.3</b> The exclusion zone barrier must be in place when the exclusion zone is in force.</p> <p><b>5.1.4</b> The exclusion zone barrier must have warning signs that:</p> <p><b>a)</b> are visible from all angles of approach; and</p> <p><b>b)</b> display symbols indicating danger and/or toxic gas is in use; and</p> <p><b>c)</b> are in a language spoken by staff at the fumigation site.</p> <p><b>5.1.5</b> The size of the exclusion zone must not be less than:</p> <p><b>a)</b> 3 metres from the enclosure, if the enclosure is located outdoors, or</p> <p><b>b)</b> 6 metres from the enclosure, if the enclosure is located inside a building or structure.</p> <p><b>5.1.6</b> The exclusion zone must be in force from immediately prior to methyl bromide injection and until the enclosure has been ventilated and the methyl bromide concentration is verified at or below the threshold limit value (TLV) in accordance with section 11 Ventilating the fumigation enclosure.</p>	<p>Risk area renamed "Exclusion Zone". Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use.</p> <p>Reworded for clarity.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
		<ul style="list-style-type: none"> <li>• be in a language or languages appropriate to the location.</li> </ul> <p><b>2.2.6</b> The risk area, with the exception of chamber fumigations, must be in force from the time immediately prior to connection of the methyl bromide supply (either cylinder or can) to the supply system up until the gas concentration in the risk area and the enclosure is verified at or below the TLV–TWA.</p> <p><b>2.2.7</b> Anyone entering the risk area while it is in force must be wearing appropriate Personal Protective Equipment (PPE) at all times.</p>	<p><b>5.1.7</b> If the enclosure is a fumigation chamber, compliant with section 4.3 Fumigation chambers, or a vacuum chamber, compliant with section 4.5 Vacuum chamber, the exclusion zone may be removed once the methyl bromide has been injected and the doors are locked.</p> <p><b>5.1.8</b> If the exclusion zone is removed in accordance with requirement 5.1.7, the exclusion zone must be re-established prior to ventilation and remain in-place until the methyl bromide concentration is verified at or below the TLV in accordance with section 11 Ventilating the fumigation enclosure.</p>	
<b>Safety</b>		<p><b>2.3</b> Personal protective equipment (PPE)</p> <p><b>2.3.1</b> Suitable respiratory protection must be worn at all times inside the risk area while it is in force.</p> <p><b>2.3.2</b> Respiratory protection must be worn at all times when inside the buffer zone during ventilation. See 9 Ventilating the enclosure.</p> <p><b>2.3.3</b> A full-face respirator must be:</p> <ul style="list-style-type: none"> <li>• operated in accordance with the manufacturer’s instructions</li> <li>• fitted with the correct gas filter canister (AX for methyl bromide) and replaced in accordance with the manufacturer’s instructions</li> <li>• maintained in good condition with all valves clean and intact</li> <li>• able to form an airtight seal against the face of the fumigator.</li> </ul> <p><b>2.3.4</b> Self-contained breathing apparatus must be:</p> <ul style="list-style-type: none"> <li>• operated in accordance with the manufacturer’s instructions</li> <li>• used only by properly trained personnel</li> <li>• maintained in good working order</li> <li>• refilled from a safe source.</li> </ul>	<p><i>Retained under 2.3 Personal protective equipment (PPE) but reworded.</i></p> <p><b>2.3.1</b> Respiratory protection equipment must be worn, at all times, by any person inside the exclusion zone, including during ventilation from the time of injecting methyl bromide into the fumigation enclosure until the threshold limit value (TLV) is achieved.</p> <p><b>2.3.2</b> Full-face respirators must be:</p> <ul style="list-style-type: none"> <li><b>a)</b> operated in accordance with the manufacturer’s instructions; and</li> <li><b>b)</b> fitted with a gas filter canister suitable for use with methyl bromide and replaced in accordance with the manufacturer's instructions; and</li> <li><b>c)</b> maintained in accordance with the manufacturer's instructions, with all valves clean and intact; and</li> <li><b>d)</b> able to form an airtight seal against the face of the fumigator.</li> </ul> <p><b>2.3.3</b> Self-contained breathing apparatus must be:</p> <ul style="list-style-type: none"> <li><b>a)</b> operated in accordance with the manufacturer’s instructions; and</li> <li><b>b)</b> used only by properly trained personnel; and</li> <li><b>c)</b> maintained in good working order and in accordance with the manufacturer’s instructions.</li> </ul>	Re-worded to rely on manufacturer instructions rather than the methodology. Definition of good working order added to the definitions.
<b>Fumigation enclosures</b>	<b>3.1</b> Gas-tightness	<p><b>3.1.1</b> All fumigation enclosures must be sufficiently gas-tight to retain the fumigant for the duration of the exposure period and maintain the concentrations at or above the requirements.</p>	<i>Moved to Section 4.1 All enclosures.</i>	Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use. Enclosure requirements edited to remove ‘exclusions’ and simplify to account for the different types of enclosures that are utilised. All enclosure requirements apply in every situation. Enclosure specific requirements stipulated as such in their respective sections.
<b>Fumigation enclosures</b>	<b>3.2</b> Sheeted enclosures	<p><b>3.2.1</b> The surface on which the sheeted enclosure will be created must be:</p> <ul style="list-style-type: none"> <li>• impervious to methyl bromide or covered with a gas-proof sheet if the surface is not impervious</li> <li>• free of debris that might prevent a gas-tight seal or damage the sheet</li> <li>• free of cracks and drains or other openings that will permit excessive leakage.</li> </ul> <p><b>3.2.2</b> The fumigation sheets must be impervious to methyl bromide. They must be able to retain the required concentration for the duration of the fumigation without needing to add additional methyl bromide due to permeation through the sheet.</p> <p><b>3.2.3</b> A gas-tight seal must be created between the fumigation surface and the sheet.</p> <p><b>3.2.4</b> If one or more shipping container is fumigated in a sheeted enclosure at least one door of each container must be open during the fumigation.</p>	<p><i>Moved to section 4.2 Sheeted enclosures.</i></p> <p><b>4.2.1</b> Section 4.2 requirements apply to sheeted enclosures.</p> <p><b>4.2.2</b> Surfaces on which sheeted enclosures are constructed must be impermeable to methyl bromide or covered with a gas-proof sheet to make it impermeable.</p> <p><b>4.2.3</b> Fumigation sheets must be weighed down to seal it against the surface and hold it securely in place. The seal must be:</p> <ul style="list-style-type: none"> <li><b>a)</b> created using materials that can follow the contour of the surface; and</li> <li><b>b)</b> arranged so there are no gaps or breaks in the seal around the entire enclosure.</li> </ul> <p><b>4.2.4</b> All sea containers fumigated in a sheeted enclosure must have at least one door open during the fumigation.</p> <p><b>4.2.5</b> If multiple sea containers are fumigated in a sheeted enclosure the fumigation must be monitored in accordance with section 5.3 Gas concentration monitoring locations.</p>	Reworded to improve consistency and clarity and remove ambiguity

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>Fumigation enclosures</b>	<b>3.3</b> Unsheeted enclosures	<p><b>3.3.1</b> A shipping container can be used as a fumigation enclosure if it can be sealed to make it adequately gas tight. The fumigator must:</p> <ul style="list-style-type: none"> <li>• check the container for any visible holes or damage that would make it unsuitable</li> <li>• seal the air vents from the outside</li> <li>• install sampling tubes—see 4.1 Concentration sampling tubes</li> <li>• install a fan—if there is insufficient space the container must be fumigated as a sheeted enclosure</li> <li>• arrange the tubes and leads so they exit the container where the doors meet at the base of the container</li> <li>• create a barrier to reduce air flow under the container.</li> </ul> <p><b>3.3.2</b> The methyl bromide must be applied through the door seals and the supply pipe must be removed after the process is complete. This is easiest to do through the door seals where they meet at the top of the container.</p> <p><b>3.3.3</b> Where a false door is fitted to create a gas tight seal, the supply pipe, sampling tubes and power leads must pass through the false door.</p> <p><b>3.3.4</b> Where an un-sheeted shipping container fumigation is conducted on a skeletal trailer, leak checks must be conducted on the underside of the container. A barrier to reduce airflow under the container is not required.</p> <p><b>3.3.5</b> Shipping containers under gas must not be moved until they have been ventilated.</p> <p><b>3.3.6</b> If the target of the fumigation includes the exterior of the container, for example Giant African Snail treatments, the container(s) must be enclosed under gas-proof sheets.</p>	<p><i>Moved to section 4.1 All enclosures.</i></p> <p><b>4.1.1</b> All fumigation enclosures must be:</p> <ul style="list-style-type: none"> <li><b>a)</b> sufficiently gas-tight to retain the methyl bromide for the duration of the exposure period; and</li> <li><b>b)</b> prepared to safely inject and ventilate methyl bromide; and</li> <li><b>c)</b> sealed to minimise methyl bromide escape; and</li> <li><b>d)</b> prepared to ensure even methyl bromide distribution throughout the enclosure; and</li> <li><b>e)</b> monitored for temperature if applicable.</li> </ul> <p><b>4.1.2</b> Each individual enclosure is a separate fumigation and must be recorded on its own record of fumigation.</p>	<p>The requirements for an unsheeted container are the same as requirements for all enclosures. No need to specifically mention these conditions again.</p>
<b>Fumigation enclosures</b>	<b>3.4</b> Fumigation chambers	<p><b>3.4.1</b> Fumigation chambers are permanent structures designed specifically for fumigation. To be considered a fumigation chamber for the purposes of this methodology they must:</p> <ul style="list-style-type: none"> <li>• be constructed from rigid materials on all sides, including the door</li> <li>• be permanently sealed along all joints between the walls, roof and floor</li> <li>• be gas-tight once the door is closed without the need to use tape, sealant, sand snakes or any other means.</li> <li>• not have anything, such as sampling tubes, supply pipes or electrical leads, enter the chamber through the door that will interfere with the seal</li> <li>• have an inbuilt extraction system that actively removes the fumigant from the enclosure</li> <li>• pass a pressure test at least every six months according to 3.5 Pressure testing.</li> </ul>	<p><i>Moved to section 4.3 Fumigation chambers.</i></p> <p><b>4.3.1</b> Section 4.3 requirements apply to fumigation chambers.</p> <p><b>4.3.2</b> A fumigation chamber must:</p> <ul style="list-style-type: none"> <li><b>a)</b> be permanently sealed along all joints between the walls, ceiling and floor; and</li> <li><b>b)</b> be gas-tight once the door is closed without the need to use tape, sealant, sand snakes or any other means; and</li> <li><b>c)</b> not have anything, such as concentration sampling tubes, supply pipes or electrical leads, enter the chamber that will interfere with the seal; and</li> <li><b>d)</b> have an inbuilt extraction system that actively removes methyl bromide from the enclosure; and</li> <li><b>e)</b> pass a pressure test at least every six months in accordance with section 4.4 Pressure testing a fumigation chamber.</li> </ul>	<p>Reworded for consistency and clarity as there are a variety of enclosures used for fumigation. Key difference for fumigation chambers vs other enclosures is its ability to remain gas tight and the removal of the exclusion zone during the exposure period.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>Fumigation enclosures</b>	<b>3.5</b> Pressure testing	<p><b>3.5.1</b> Raise the pressure in the enclosure by 250 Pa. Count the seconds it takes to fall from 200 Pa to 100 Pa. If the time is 10 seconds or more the enclosure has passed the pressure test and is considered gas-tight for fumigation purposes.</p> <p><b>3.5.2</b> The pressure test must be performed with the enclosure set up ready for fumigation. Sampling tubes, supply pipes and electrical leads must be in place during the pressure test as they would be for a fumigation.</p>	<p><i>Moved to section 4.4 Pressure testing a fumigation chamber.</i></p> <p><b>4.4.1</b> Pressure testing must be performed with all concentration sampling tubes, supply pipes and electrical leads in place as they would be for fumigation.</p> <p><b>4.4.2</b> To perform a pressure test, the pressure within the enclosure must be raised by 250 pascals (Pa) relative to atmospheric pressure. To pass the pressure test, it must take 10 seconds or more for the pressure in the enclosure to fall from 200 Pa to 100 Pa relative to atmospheric pressure.</p> <p><b>4.4.3</b> If the pressure falls from 200 Pa to 100 Pa in less than 10 seconds, the enclosure has not passed the pressure test and an exclusion zone must be maintained throughout the exposure period in accordance with section 5.1 Establish an exclusion zone.</p> <p><b>4.4.4</b> A record of the pressure test must be completed for every pressure test and kept for a minimum of two years.</p> <p><b>4.4.5</b> All following information must be recorded on a record of pressure test:</p> <p>a) Location – the site address where the pressure test was performed.</p> <p>b) Chamber identification details.</p> <p>c) Time and date the pressure test was performed.</p> <p>d) The name and signature of the person who performed the pressure test.</p> <p>e) The time taken for the pressure in the enclosure to fall from 200 Pa to 100 Pa.</p> <p><b>4.4.6</b> A record of pressure test must be completed accurately.</p>	<p>Reworded for clarity. Added details about the record of the pressure test and minimum requirements for the information that must be captured on that record.</p>
<b>Fumigation enclosures</b>	Nil	New Clause	<p><i>New section 4.5 Vacuum chamber.</i></p> <p><b>4.5.1</b> Section 4.5 requirements apply to vacuum chambers.</p> <p><b>4.5.2</b> A vacuum chamber must be capable of attaining an initial vacuum of at least 660 mmHg, equivalent to 88 kPa.</p> <p><b>4.5.3</b> Once methyl bromide has been injected, the resulting vacuum pressure must be maintained without further extraction of gas from the chamber for the duration of the exposure period.</p> <p><b>4.5.4</b> The exposure period for fumigations performed in a vacuum chamber starts at the completion of methyl bromide injection into the chamber.</p> <p><b>4.5.5</b> Temperature and pressure must be monitored within the chamber for the duration of the treatment.</p>	<p>Clauses added for Vacuum chamber fumigations.</p>
<b>Preparing the fumigation enclosure</b>	<b>4.1</b> Concentration sampling tubes	<p><b>4.1.1</b> Each sampling tube must be clearly identified according to their location within the enclosure.</p> <p><b>4.1.2</b> The sampling tubes must be free of kinks and blockages.</p> <p><b>4.1.3</b> The diameter of the sampling tubes must fit the inlet of the concentration measuring instrument.</p>	<p><i>New section 5.2 Gas concentration monitoring equipment.</i></p> <p><b>5.2.1</b> All gas concentration monitoring equipment must be able to detect methyl bromide concentrations within the treatment dose range for the goods treated and be in good working order.</p> <p><b>5.2.2</b> Gas concentration monitoring instrument must be operated, calibrated and serviced according to the manufacturer’s instructions.</p> <p><b>5.2.3</b> If using concentration sampling tubes that extend outside the enclosure, each concentration sampling tube must:</p> <p>a) be clearly identified according to their location within the enclosure; and</p> <p>b) be free from kinks and blockages; and</p> <p>c) be of a diameter suitable to fit the inlet of the concentration measuring instrument.</p> <p><b>5.2.4</b> If gas concentration monitoring instruments are placed within the enclosure each instrument must:</p>	<p>Sampling tube requirements have been amended to ensure emerging gas monitoring technology that can be left inside the enclosure is covered. More details have been included for placement and locations of gas monitoring equipment.</p>



Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>a)</b> allow for readings to be read outside of the exclusion zone; and</p> <p><b>b)</b> be clearly identified according to their location within the enclosure.</p>	
		New Note	<p><i>New note under 5.3 Gas concentration monitoring locations.</i></p> <p><b>Note:</b> Section 5.3 does not apply to perishable commodities. See section 5.4 for gas concentration location requirements for perishable commodities.</p>	Note added for clarity
Preparing the fumigation enclosure	4.2 Concentration sampling tube placement—non-perishable commodities	4.2.1 Enclosures that are 30 m <sup>3</sup> or less in volume require at least one sampling tube positioned as near as practicable to the top centre of the commodity.	<p><i>Moved to section 5.3 Gas concentration monitoring locations.</i></p> <p><b>5.3.1</b> Enclosures less than 30 m<sup>3</sup> in volume must have at least one gas concentration monitoring location. The monitoring location must be on the top, centre of the goods.</p>	Reworded for clarity
Preparing the fumigation enclosure	4.2 Concentration sampling tube placement—non-perishable commodities	<p>4.2.2 Enclosures larger in volume than 30 m<sup>3</sup> must have at least three sampling tubes. The sampling tubes must be positioned to check that even distribution of the fumigant has been achieved (Figure 1). The tubes must be placed as close as practicable to:</p> <ul style="list-style-type: none"> <li>• the top of the commodity at one end of the enclosure</li> <li>• the centre of the commodity around the middle of the enclosure</li> <li>• the base of the commodity at the opposite end of the enclosure from the top sampling tube</li> </ul>	<p><i>Moved to section 5.3 Gas concentration monitoring locations.</i></p> <p><b>5.3.2</b> Enclosures equal to or greater than 30 m<sup>3</sup> in volume must have at least three gas concentration monitoring locations. The monitoring locations must be:</p> <p><b>a)</b> on top of the goods within two metres of the end of the enclosure</p> <p><b>b)</b> no more than 250 mm above the floor of the enclosure and within two metres of the opposite end from the top gas concentration monitoring location, and</p> <p><b>c)</b> in the middle centre of the enclosure among the goods and at least two metres from the other gas concentration monitoring locations.</p>	Specific locations added to assist with clear articulation of requirement.
Preparing the fumigation enclosure	4.2 Concentration sampling tube placement—non-perishable commodities	4.2.3 If a consignment consists of more than one un-sheeted container then each container is a separate fumigation and needs to have a minimum of three sampling tubes in each container.	<i>Folded into clause 5.3.2.</i>	Not needed as covered in other requirements
Preparing the fumigation enclosure	4.2 Concentration sampling tube placement—non-perishable commodities	<p>4.2.4 Two containers under a gas-tight sheet is a single enclosure and must have at least three sampling tubes placed as close as practicable to (Figure 2):</p> <ul style="list-style-type: none"> <li>• the top of the commodity in the middle of each containers</li> <li>• the base of the commodity at the door in either container.</li> </ul> <p>4.2.5 Three or more containers under a gas-proof sheet is a single enclosure and must have at least one sampling tube placed as close as practicable to the top of the commodity in the middle of each container (Figure 3).</p>	<p><i>Moved to section 5.3 Gas concentration monitoring locations.</i></p> <p><b>5.3.3</b> If a sheeted enclosure contains multiple sea containers, each sea container must have at least three gas concentration monitoring locations in accordance with requirement.</p> <p><b>5.3.4</b> Additional gas concentration monitoring locations must be used if mandated by import conditions.</p>	<p>Additional requirements for sheeted enclosures, this is in line with the original intent of the document and verifies that there is enough free airspace and that concentrations are above the standard for the exposure period.</p> <p>This issue was raised by ICCBA members as a solution to failed fumigations under tarp. If they were each monitored separately, that is; they could be treated as separate enclosures if one fails two could pass.</p>
Preparing the fumigation enclosure	4.3 Concentration sampling tube placement—perishable commodities	<p>4.3.1 All perishable fumigations must have at least three sampling tubes placed within the middle of packaging, and in the positions specified in 4.3.3, to demonstrate that the treatment fumigant concentration is reached and maintained for the full exposure period within the commodity.</p>	<p><i>Moved to section 5.4 Gas concentration monitoring locations – perishable commodities.</i></p> <p><b>5.4.1</b> Section 5.4 requirements apply to perishable commodity fumigations.</p> <p><b>5.4.2</b> If there is one type of commodity and packaging, and the total enclosure volume is less than 5 m<sup>3</sup> the gas concentration must be monitored in at least one location. The gas concentration monitoring location must be inside a carton:</p> <p><b>a)</b> in the centre of the stack, or</p> <p><b>b)</b> in the middle of the enclosure, if the cartons are not stacked.</p>	New allowance for small amounts of perishables (up to one loaded pallet worth) to have one monitoring line.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Preparing the fumigation enclosure	4.3 Concentration sampling tube placement—perishable commodities	4.3.2 For cut flowers, this is within a sleeve or bunch in the centre of a carton. For other produce, this is in the centre of the carton.	Moved to section 5.4 Gas concentration monitoring locations – perishable commodities. 5.4.4 If the target of fumigation is packaged inside one or more layers of packaging, the gas concentration monitoring locations must be located inside the packaging next to the target of fumigation.	Reworded for to include other perishable type products that are lose leaf type products.
Preparing the fumigation enclosure	4.3 Concentration sampling tube placement—perishable commodities	4.3.3 Where cartons are stacked in the enclosure, sampling tubes must be placed inside cartons located in the following positions: <ul style="list-style-type: none"> <li>• the top carton at one end of the enclosure</li> <li>• the centre carton in the middle of the enclosure</li> <li>• the bottom carton at the opposite end of the enclosure from the top sampling tube.</li> </ul>	Moved to section 5.4 Gas concentration monitoring locations – perishable commodities. 5.4.3 If the enclosure is greater than 5 m3 the gas concentration must be monitored in at least three locations. The gas concentration monitoring locations must be inside a carton: <ol style="list-style-type: none"> <li>a) at the top of a stack at within 2 meters of the end of the enclosure; and</li> <li>b) no more than 250 mm above the floor of the enclosure and within 2 metres of the opposite end from the top gas concentration monitoring location, and</li> <li>c) in the middle centre of the enclosure halfway up a stack.</li> </ol>	Specific locations added to assist with clear articulation of requirement.
Preparing the fumigation enclosure	4.3 Concentration sampling tube placement—perishable commodities	4.3.4 Where different types packaging are present, sampling tubes must be placed in a representative carton of each packing type.	Moved to section 5.4 Gas concentration monitoring locations – perishable commodities. 5.4.4 If the target of fumigation is packaged inside one or more layers of packaging, the gas concentration monitoring locations must be located inside the packaging next to the target of fumigation. 5.4.5 If the target of fumigation is cut flowers, leaf, stem material or bulbs imported as nursery stock, the gas concentration monitoring location must be located within the bunch in the middle of a carton. 5.4.6 The placement and installation of gas concentration monitoring equipment within cartons or packaging must not change the gas penetration properties of the carton or package. 5.4.7 If there are different types of packaging in the consignment, there must be one gas concentration monitoring location inside each of the different packaging types. The minimum number of monitoring locations and position of the monitoring locations must be in accordance with section 5.4.3. If there are more than three different types of packaging, the number of gas monitoring locations must be the same as the number of different packaging types. 5.4.8 Additional concentration monitoring locations must be used if mandated by import conditions.	Additional requirement added to clarify monitoring perishables where goods are packaged.
Preparing the fumigation enclosure	4.4 Temperature probes for perishable commodities	4.4.1 Where the treatment schedule requires the commodity temperature of perishable fumigations is used for dose calculations, temperature readings must be taken by: <ul style="list-style-type: none"> <li>• For fruit and vegetables, the pulp temperature must be measured by inserting temperature probes into the centre of a piece, or pieces, of fruit or vegetable in the middle of a carton, ensuring that the whole temperature probe is covered.</li> <li>• For cut flowers, leaf or stem material, temperate probes must be placed within the bunch in the middle of a carton.</li> </ul> 4.4.2 At least three temperature readings must be taken from different cartons in different locations and, if applicable, different varieties within the consignment.	Moved to section 5.5 Temperature monitoring instrument locations. 5.5.1 Section 5.5 requirements apply to perishable commodity fumigations and controlled temperature fumigations. 5.5.2 The temperature of the enclosure must be monitored with a digital thermometer in at least one location within the enclosure. 5.5.3 If heaters are used, the temperature monitoring instruments must be placed within the enclosure as far away as practical from the heat source. 5.5.4 Temperature monitoring instruments must: <ol style="list-style-type: none"> <li>a) allow for readings to be read outside of the exclusion zone; and</li> <li>b) be identified</li> </ol>	Amended to include other commodities that may need the goods to be monitored for temperature.
Preparing the fumigation enclosure	4.4 Temperature probes for perishable commodities	4.4.3 The temperature probes must be maintained to an accuracy of at least plus or minus (+/-) 1 °C.	Moved to 1.2 Fumigation equipment.	Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Preparing the fumigation enclosure	4.5 Fumigant supply pipes	<p><b>4.5.1</b> Multiple containers fumigated in a single enclosure must have at least one supply pipe placed in each container.</p> <p><b>4.5.2</b> For fumigations under sheets the supply pipes must be left in position for the duration of the exposure period.</p> <p><b>4.5.3</b> The supply pipes must be sealed once the fumigant has been applied.</p>	<p><b>5.6</b> Methyl bromide supply pipes</p> <p><b>5.6.1</b> If a sheeted enclosure contains multiple sea containers, at least one supply pipe must be placed in each sea container.</p> <p><b>5.6.2</b> For sheeted enclosure fumigations, the supply pipes must be left in position for the duration of the exposure period.</p> <p><b>5.6.3</b> Supply pipes left in place must be sealed once the methyl bromide has been injected.</p>	Reworded for clarity
Preparing the fumigation enclosure	4.6 Fans	<p><b>4.6.1</b> Enclosures must have at least one fan for each 100 m<sup>3</sup> of volume or part thereof.</p> <p><b>4.6.2</b> Multiple containers fumigated in a single enclosure must have at least one fan to be placed in each container.</p>	<p><i>Moved to section 5.7 Heaters and fans.</i></p> <p><b>5.7.1</b> If fans are used to circulate the gas, enclosures must have at least one fan for each 100 m<sup>3</sup> of volume or part thereof.</p> <p><b>5.7.2</b> Multiple sea containers fumigated in a single enclosure must have at least one fan placed in each container.</p> <p><b>5.7.3</b> If heaters are used, they must be positioned in such a way to raise and maintain the air temperature throughout the entire enclosure above the treatment temperature used for the dose calculation.</p>	Added heaters to this section
Calculating the dose	5.1 Dose rate	<b>5.1.1</b> The dose rate for the appropriate temperature prescribed by the relevant authority must be used for QPS fumigations with methyl bromide.	<p><i>Moved to section 1.1 Fumigation personnel.</i></p> <p><b>1.1.2</b> The fumigator-in-charge must comply with the treatment schedule, as set by the relevant authority, for the goods being treated.</p>	Order of the documented amended to reflect the workflow of the fumigation more closely - ease of use
Calculating the dose	5.2 Dose rate compensation for temperatures below 21 °C	<b>5.2.1</b> If the treatment rate is set with a minimum of 21 °C and the temperature within the enclosure is expected to fall below 21 °C at any time during the exposure period, the dose rate must be adjusted to compensate for the lower temperature. <b>5.2.2</b> In the absence of any other specific schedule set by the relevant authority the following compensation must be made: For each 5 °C, or part thereof, the temperature is expected to fall below 21 °C add 8 g/m <sup>3</sup> to the prescribed dose rate.	<p><i>Moved to section 8.1 Dose rate compensation for temperature variation</i></p> <p><b>8.1.1</b> If the treatment schedule or import conditions allow dose compensation for temperature variation, and the enclosure temperature is expected to fall below the temperature specified in the treatment schedule, the dose rate may be adjusted to compensate for the lower temperature.</p> <p><b>8.1.2</b> If the treatment schedule allows dose compensation for temperature variation, (in accordance with requirement 8.1.1) and the treatment schedule does not specify dose compensation requirements the following calculation must be used: for each 5°C, or part thereof, the temperature is expected to fall below 21°C add 8 g/m<sup>3</sup> to the prescribed dose rate.</p>	Amended to specify that this can only be done if allowable in the treatment schedule/import conditions
Calculating the dose	5.3 Temperature	<b>5.3</b> Temperature	<p><i>Temperature has been split into two sections for clarity.</i></p> <p><b>6.</b> Temperature used to calculate the dose</p> <p><b>7.</b> Temperature during the exposure.</p> <p><i>Each of these sections are split into three sections</i></p> <ul style="list-style-type: none"> <li>• Ambient temperature fumigations</li> <li>• Controlled temperature fumigations and</li> <li>• Perishable commodity fumigations.</li> </ul>	This was done to clarify the difference as this was often confused and a source of non-compliance.
Calculating the dose	5.3 Temperature	<b>5.3.1</b> The temperature of the consignment must be equal to or above the minimum allowable temperature before any fumigant can be applied.	<i>Changes reflected in the new sections 6 Temperature used to calculate the dose and 7 Temperature during the exposure.</i>	Current clause implies that the temperature of goods needed to be verified prior to commencing fumigation. This was not the intent of the clause so has been removed.
Calculating the dose	5.3 Temperature	<p><b>5.3.2</b> Unless stated otherwise in a specific treatment schedule, fumigation of non-perishable commodities is not permitted if the ambient minimum temperature is forecast to fall below 10 °C.</p> <p><b>5.3.3</b> Unless stated otherwise in a specific treatment schedule, fumigation of perishables is not permitted if the commodity temperature is below 10 °C.</p>	<p><i>Intent to maintain treatment above the required temperature is contained in 6 Temperature used to calculate the dose.</i></p> <p><b>Note:</b> If the ambient temperature is forecast to be 10°C or lower the fumigation cannot be performed as an ambient temperature fumigation. The temperature of the enclosure will need to be raised and maintained meaning the controlled temperature fumigation requirements will apply.</p> <p><i>Intent to maintain treatment above the required temperature is also contained in 7 Temperature during the exposure.</i></p>	<p>Temperature requirements are specified in the treatment schedule.</p> <p>Key control is that temperature must remain above that which is used to calculate the dose rate.</p> <p>Notes added for clarity.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>7.1.3</b> During the exposure period:</p> <p><b>a)</b> the minimum temperature must be equal to or above the temperature used for dosing, or</p> <p><b>b)</b> if dose calculations for temperature variation is permitted and the minimum temperature is above 10°C, all concentration readings must be equal to or above the standard concentration requirements in Appendix 4: Methyl bromide monitoring tables for the minimum temperature obtained.</p> <p><b>Note:</b> If the temperature obtained during the exposure period is equal to or below 10°C the fumigation has failed.</p>	
Calculating the dose	5.3 Temperature	5.3.4 The commodity temperature of perishable commodities must be measured according to 4.4 Temperature probes for perishable commodities and the lowest recorded temperature used to calculate the dose rate. See 5.2 Dose rate compensation for temperatures below 21 °C	<p><i>Moved to section 6.3 Perishable commodity fumigations</i></p> <p><b>6.3.1</b> Section 6.3 requirements apply to perishable commodity fumigations.</p> <p><b>6.3.2</b> Dose calculations must be based on the core temperature specified in the treatment schedule.</p> <p><b>6.3.3</b> Prior to applying the dose:</p> <p><b>a)</b> the fumigator must measure the core temperature of the goods; and</p> <p><b>b)</b> the core temperature of the goods must be at or above the temperature specified in the treatment schedule.</p> <p><b>6.3.4</b> The minimum number of temperature readings required in 6.3.3 is the same as the number of concentration monitoring locations required in section 5.4 Gas concentration monitoring locations – perishable commodities.</p> <p><b>6.3.5</b> Temperature readings must be obtained:</p> <p><b>a)</b> from the same positions as the concentration monitoring locations, or</p> <p><b>b)</b> with at least one temperature reading from each different type of perishable commodity within the enclosure.</p> <p><b>6.3.6</b> If the target of fumigation is fruit or vegetables, the pulp temperature must be measured. The temperature measuring instrument must be:</p> <p><b>a)</b> inserted into the centre of the fruit or vegetable, or adjacent to the pit; and</p> <p><b>b)</b> covering the whole temperature instrument probe (multiple pieces of fruit may be inserted onto the instrument if the fruit is small); and</p> <p><b>c)</b> placed into the largest sized commodity in mixed consignments; and</p> <p><b>d)</b> placed in the middle of the carton.</p> <p><b>6.3.7</b> If the target of fumigation is cut flowers, leaf, stem material or bulbs imported as nursery stock, temperature readings must be placed within the bunch in the middle of a carton.</p> <p><b>6.3.8</b> Dose compensation for temperature variation does not apply to perishable commodities unless specified by the treatment schedule.</p> <p><b>6.3.9</b> If the treatment schedule allows dose compensation for temperature variation, the temperature used for dose compensation must be the lowest of:</p> <p><b>a)</b> the temperature of the goods, or</p> <p><b>b)</b> the expected minimum temperature within the enclosure during the exposure period and compliant with section 6.1 Ambient temperature fumigations or 6.2 Controlled temperature fumigations.</p> <p><i>Also moved to section 7.3 Perishable commodity fumigations</i></p> <p><b>7.3.1</b> Section 7.3 requirements apply to perishable commodity fumigations.</p>	Request for more clarity on temperature requirements and packaging lead to structural changes to the methodology, more detail in packaging and clearly defining temperature requirements for calculating the dose and temperature during the exposure period.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>7.3.2</b> The temperature of the enclosure must be monitored and recorded at least once every 15 minutes for the entirety of the exposure period. These records must be retained with the fumigation documentation.</p> <p><b>7.3.3</b> The temperatures recorded during the exposure period, including enclosure temperature and all core/pulp temperatures, must be equal to or above the temperature used for dosing.</p> <p><b>7.3.4</b> The minimum temperature of the goods achieved for the exposure period must be recorded on the record of fumigation.</p>	
<b>Calculating the dose</b>	<b>5.3</b> Temperature	<p><b>5.3.5</b> Where the enclosure is subject to the ambient temperature of the surrounding environment, the fumigator must check what the forecast minimum temperature will be during the exposure period for the location closest to the fumigation site and adjust the dose rate accordingly.</p> <p><b>5.3.6</b> The forecast minimum temperature used and the source of the information must be recorded.</p> <p><b>5.3.7</b> Fumigation is not permitted if the temperature of the enclosure and consignment is expected to fall below any specified minimum temperature during the exposure unless the temperature can be raised to and maintained at or above the allowed minimum temperature by using heaters or moving the consignment inside a structure where the temperature can be adequately controlled.</p>	<p><i>Moved to section 6.1 Ambient temperature fumigations.</i></p> <p><b>6.1.1</b> Section 6.1 requirements apply to ambient temperature fumigations.</p> <p><b>6.1.2</b> A weather forecast for the location closest to the fumigation site must be obtained from a verifiable weather source to determine the forecast temperature during the fumigation exposure period.</p> <p><b>6.1.3</b> The lowest forecast minimum temperature for the exposure period must be used to calculate the dose as specified in section 8.2 Calculating the dose.</p> <p><b>6.1.4</b> The forecast minimum temperature must be sourced no earlier than the previous day of the start of exposure period and a record of the source of the information must be retained with the fumigation documentation.</p> <p><b>6.1.5</b> The forecast minimum temperature must be recorded on the record of fumigation.</p> <p><i>Also moved to section 7.1 Ambient temperature fumigations.</i></p> <p><b>7.1.1</b> Section 7.1 requirements apply to ambient temperature fumigations.</p> <p><b>7.1.2</b> The minimum ambient temperature must be obtained using:</p> <ul style="list-style-type: none"> <li>a) a verifiable weather source, or</li> <li>b) temperature monitoring equipment compliant with section 1.2 Fumigation equipment.</li> </ul> <p><b>7.1.3</b> During the exposure period:</p> <ul style="list-style-type: none"> <li>a) the minimum temperature must be equal to or above the temperature used for dosing, or</li> <li>b) if dose calculations for temperature variation is permitted and the minimum temperature is above 10°C, all concentration readings must be equal to or above the standard concentration requirements in Appendix 4: Methyl bromide monitoring tables for the minimum temperature obtained.</li> </ul> <p><b>Note:</b> If the temperature obtained during the exposure period is equal to or below 10°C the fumigation has failed.</p>	<p>Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use</p> <p>Request for more clarity on temperature requirements and packaging lead to structural changes to the methodology, more detail in packaging and clearly defining temperature requirements for calculating the dose and temperature during the exposure period.</p>
<b>Calculating the dose</b>	<b>5.3</b> Temperature	<p><b>5.3.8</b> Where the fumigation is performed in a controlled temperature environment, the temperature within the enclosure must be monitored and recorded. Temperature recording instruments must be placed as far away as practicable from the heat source.</p>	<p><i>Moved to section 6.2 Controlled temperature fumigations.</i></p> <p><b>6.2.1</b> Section 6.2 requirements apply to controlled temperature fumigations.</p> <p><b>6.2.2</b> The minimum temperature within the enclosure during the exposure period must be predicted. This predicted temperature must be used to calculate the dose in accordance with section 8.2 Calculating the dose.</p> <p><i>Also moved to section 7.2 Controlled temperature fumigations.</i></p> <p><b>7.2.1</b> Section 7.2 requirements apply to controlled temperature fumigations.</p>	<p>Request for more clarity on temperature requirements and packaging lead to structural changes to the methodology, more detail in packaging and clearly defining temperature requirements for calculating the dose and temperature during the exposure period.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>7.2.2</b> The temperature within the enclosure must be monitored with a minimum of one temperature instrument.</p> <p><b>7.2.3</b> The temperature within the enclosure must be monitored and recorded at least once every 15 minutes for the entirety of the exposure period. These records must be retained with the fumigation documentation.</p> <p><b>7.2.4</b> The temperatures recorded within the enclosure during the exposure period must be equal to or above the temperature used for dosing.</p> <p><b>7.2.5</b> The minimum temperature recorded within the enclosure during the exposure period must be recorded on the record of fumigation.</p>	
Calculating the dose	5.4 Dose calculation	5.4.1 The dose must be calculated by multiplying the dose rate (including any adjustments) by the volume of the enclosure. The formula is: Dose (g) = Enclosure Volume (m3) x Dose Rate Concentration (g/m3)	<p><i>Moved to section 8.2 Calculating the dose.</i></p> <p><b>8.2.1</b> The weight of methyl bromide needed to achieve the prescribed concentration must be calculated by multiplying the dose rate (temperature adjusted as per section 8.1 Dose rate compensation for temperature variation) by the volume of the enclosure. The formula is: Dose (g) = Enclosure Volume (m3) x Dose Rate (g/m3)</p>	Order of the document amended to more closely reflect the workflow of the fumigation - ease of use
Calculating the dose	5.5 Enclosure volume	<p>5.5.1 If the fumigation is done under gas-proof sheets, the external dimensions must be measured each time and used to calculate the volume.</p> <p>5.5.2 For fixed sized enclosures such as chambers and un-sheeted containers the internal volume must be use</p>	<p><i>Moved to section 8.2 Calculating the dose.</i></p> <p><b>8.2.2</b> If the fumigation is performed as a sheeted enclosure, the external dimensions of the enclosure must be measured prior to each fumigation and used to calculate the enclosure volume.</p> <p><b>8.2.3</b> If the fumigation is performed in a fixed-sized enclosure, the internal dimensions of the enclosure must be used to calculate the enclosure volume.</p> <p><b>8.2.4</b> If the methyl bromide is mixed with another gas, compensation must be made to the dose amount, so the full amount of methyl bromide required is injected into the enclosure. For methyl bromide supplied with 2% chloropicrin the formula is: Dose (g) = (Enclosure Volume (m<sup>3</sup>) x Dose Rate (g/m<sup>3</sup>)) ÷ 0.98</p> <p><b>8.2.5</b> Once the dose has been calculated, the injected dose must be rounded up to the next increment that can be accurately measured by the equipment used to dispense methyl bromide. If methyl bromide is supplied in cans the dose must be rounded up to the next full can.</p>	Order of the document amended to reflect the workflow of the fumigation more closely - ease of use
Calculating the dose	5.6 Chloropicrin	5.6.1 When methyl bromide is mixed with chloropicrin, compensation must be made to the dose to ensure that full amount of methyl bromide required is applied to the enclosure. For methyl bromide supplied with 2% chloropicrin the formula is: Dose = (Volume x Concentration) ÷ 0.98	<p><i>Moved to section 8.2 Calculating the dose.</i></p> <p><b>8.2.4</b> If the methyl bromide is mixed with another gas, compensation must be made to the dose amount, so the full amount of methyl bromide required is injected into the enclosure. For methyl bromide supplied with 2% chloropicrin the formula is: Dose (g) = (Enclosure Volume (m<sup>3</sup>) x Dose Rate (g/m<sup>3</sup>)) ÷ 0.98</p>	Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use
Calculating the dose	5.7 Rounding	5.7.1 Once the dose has been calculated, the amount must be rounded up to next increment that can be accurately measured by the equipment used to dispense the dose. If the methyl bromide is supplied in cans then the dose must be rounded up to the next full can. 5.7.2 The dose must not be rounded up until all other calculations have been completed.	<p><i>Moved to section 8.2 Calculating the dose.</i></p> <p><b>8.2.5</b> Once the dose has been calculated, the injected dose must be rounded up to the next increment that can be accurately measured by the equipment used to dispense methyl bromide. If methyl bromide is supplied in cans the dose must be rounded up to the next full can</p>	Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use
Applying the dose	6.1 Vaporising the methyl bromide	<p>6.1.1 A vaporiser must be used when methyl bromide is applied to the enclosure.</p> <p>6.1.2 The heat source for the vaporiser must be capable of heating the water in the vaporiser to at least 65 °C and maintaining the temperature at or above this while the methyl bromide is being applied to the enclosure. Methyl bromide fumigation methodology, July 2018, version 2.0 Department of Agriculture and Water Resources 10</p>	<p><i>Moved to section 8.3 Injecting methyl bromide into the fumigation enclosure.</i></p> <p><b>8.3.1</b> A vaporiser must be used when methyl bromide is injected into the enclosure. The vaporiser must maintain a water temperature of at least 65°C while the methyl bromide is being injected to the enclosure.</p> <p><b>8.3.2</b> A fan(s) must be used while injecting methyl bromide into the enclosure (see 5.7 Heaters and fans).</p>	<p>Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use.</p> <p>Minor wording changes for consistency and clarity.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
		<p><b>6.1.3</b> If the temperature of the water falls below 65 °C, the rate of methyl bromide release must be slowed or stopped until the water temperature is heated back above 65 °C.</p> <p><b>6.1.4</b> The time methyl bromide injection was completed must be recorded. <b>6.1.5</b> The connections in the supply system must be secure and free from leaks.</p>	<p><b>8.3.3</b> Supply cylinders and the vaporiser must be inside the exclusion zone while methyl bromide is being injected into the enclosure.</p> <p><b>8.3.4</b> The time methyl bromide injection was completed must be recorded on the record of fumigation.</p>	
<b>Applying the dose</b>	<b>6.2</b> Checking for leaks	<p><b>6.2.1</b> Suitable leak detection equipment must be used.</p> <p><b>6.2.2</b> The leak detection equipment must be sensitive enough to reliably detect methyl bromide concentrations down to 20 ppm.</p> <p><b>6.2.3</b> The leak detection equipment must be maintained and electronic equipment calibrated in accordance with the manufacturer's instructions.</p>	<p><i>Covered under the following clause.</i></p> <p><b>1.2.1</b> The equipment used for performing a fumigation must be fit for purpose and in good working order.</p> <p><b>1.2.2</b> Electronic instruments used to measure temperature, methyl bromide concentration or to detect the presence of methyl bromide, must be calibrated and serviced in accordance with the manufacturer's instructions. If the manufacturer's instructions are silent on calibration frequency, equipment must be calibrated every 12 months.</p>	Removal of duplication.
<b>Applying the dose</b>	<b>6.2</b> Checking for leaks	<p><b>6.2.4</b> During the injection of the dose the supply system must be checked for leaks. If a leak is detected the problem must be rectified before continuing to inject the dose.</p> <p><b>6.2.5</b> The fumigation enclosure must be checked for leaks. If leaks are detected they must be rectified.</p>	<p><i>Moved to section 8.4 Checking for leaks.</i></p> <p><b>8.4.1</b> During the injection of methyl bromide, the supply system must be checked for leaks. If a leak is detected the problem must be rectified before continuing to inject the dose.</p> <p><b>8.4.2</b> The fumigation enclosure must be checked for leaks (unless the fumigation is being performed in a pressure tested enclosure). If leaks are detected, they must be rectified.</p>	Minor wording update.
<b>Applying the dose</b>	<b>6.3</b> Circulating the fumigant	<p><b>6.3.1</b> The fans must be operating prior to and during the injection of the fumigant dose into the enclosure. <b>6.3.2</b> The fans must be turned off before taking concentration readings.</p>	<p><i>Moved to section 8.3 Injecting methyl bromide into the fumigation enclosure.</i></p> <p><b>8.3.2</b> A fan(s), or alternate way of distributing the gas, must be used while injecting methyl bromide into the enclosure (see 5.7 Heaters and fans).</p>	Order of the documented amended to reflect the workflow of the fumigation more closely - ease of use.
<b>Monitoring fumigant concentration levels</b>	<b>7.1</b> Concentration measuring instruments	<p><b>7.1.1</b> The instrument used for measuring fumigant concentrations in the enclosure must be fit for purpose and in good working order.</p> <p><b>7.1.2</b> The concentration measuring instruments must be calibrated and/or serviced according to the manufacturer's instructions.</p> <p><b>7.1.3</b> The fumigator must have a copy of the user's manual for the particular instrument they use and must operate the equipment in accordance with the manual.</p> <p><b>7.1.4</b> The instrument must be fitted with any moisture, carbon dioxide or other filters as specified by the manufacturer to suit the circumstances of the fumigation.</p>	<p><i>Moved to section 1.2 Fumigation equipment.</i></p> <p><b>1.2.1</b> The equipment used for performing a fumigation must be fit for purpose and in good working order.</p> <p><b>1.2.2</b> Electronic instruments used to measure temperature, methyl bromide concentration or to detect the presence of methyl bromide, must be calibrated and serviced in accordance with the manufacturer's instructions. If the manufacturer's instructions are silent on calibration frequency, equipment must be calibrated every 12 months.</p> <p><b>1.2.3</b> Gas concentration measuring instruments must be fitted with any filters as specified by the manufacturer to suit the circumstances of the fumigation.</p> <p><b>1.2.4</b> Equipment must be used in accordance with the manufacturer's instruction manual.</p> <p><b>1.2.5</b> Temperature monitoring instruments must be accurate to within +/-1°C.</p>	<p>Order of the documented amended to more closely reflect the workflow of the fumigation - ease of use.</p> <p>Remove duplication.</p>
<b>Monitoring fumigant concentration levels</b>	<b>7.2</b> Monitoring frequency	<p><b>7.2.1</b> Concentration readings must be taken at the start of the fumigation and at the end of the exposure period for all fumigations. Additional readings can be taken at any time during the exposure period to check the concentrations are equal to or above the levels required for an effective treatment. See 8. Topping-up to compensate for low concentrations for details on topping-up the concentration levels</p> <p><b>7.2.2</b> Fumigations with exposure periods longer than 24 hours require concentration readings to be taken at least every 24 hours in addition to the start and end point readings.</p>	<p><i>Moved to section 9.1 Gas concentration monitoring.</i></p> <p><b>9.1.1</b> Fans used to circulate methyl bromide must be turned off before taking gas concentration readings.</p> <p><b>9.1.2</b> Gas concentration readings must be taken from all gas concentration monitoring locations at the start of the exposure period and at the end of the exposure period.</p> <p><b>9.1.3</b> If the exposure period is longer than 24 hours, concentration readings must be taken from all concentration monitoring locations at least every 24 hours in addition to the start and end point readings.</p> <p><b>9.1.4</b> All gas concentration readings must be recorded on the record of fumigation at the time they are taken. This includes readings taken</p>	Requirement to record on the ROF added to this section– Documentation errors is an area of high non-compliance. Added for clarity.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p>prior to achieving start time or optional readings during the exposure period. Readings from additional concentration monitoring locations that are mandated by import conditions must also be recorded.</p> <p><b>9.1.5</b> The time each set of concentration readings was taken must be recorded. If there is more than one reading in a set, the time the last reading was completed must be the time recorded.</p> <p><b>Note:</b> Additional readings can be taken at any time during the exposure period to check concentrations are equal to or above the levels required for an effective treatment.</p>	
		New Section	<p><i>Moved to section 9.2 Gas concentration monitoring – multiple sea containers in a sheeted stack.</i></p> <p><b>9.2.1</b> Section 9.2 applies if:</p> <p><b>a)</b> the fumigation enclosure is a sheeted enclosure with multiple sea containers, and</p> <p><b>b)</b> the target of the fumigation is contained wholly inside the sea containers.</p> <p><b>9.2.2</b> The fumigator may fail one single container in the sheeted enclosure, and pass the remainder of the sea containers in that enclosure, if:</p> <p><b>a)</b> concentration readings fall below the standard in one single container, and,</p> <p><b>b)</b> the enclosure is not, or cannot be, topped up in compliance with the topping up requirements, and</p> <p><b>c)</b> all other concentration readings in all other containers are above the standard for all other concentration readings during the exposure period.</p>	New section that ensures accurate monitoring of multiple sea containers in a sheeted stack, requiring only the failing container to be re-fumigated if the others meet standards. The intent of this is to reduce methyl bromide wastage.
<b>Monitoring fumigant concentration levels</b>	<b>7.3</b> Start time of the fumigation	<p><b>7.3.2</b> Equilibrium is achieved when the highest concentration reading is within 15% of the lowest concentration reading. The formula for calculating equilibrium is:</p> $\frac{\text{Highest reading} - \text{Lowest reading}}{\text{Lowest reading}} \times 100 = \%$ <p><b>7.3.3</b> If the result of this calculation is more than 15%, equilibrium has not been achieved and the fans must be turned on again to further circulate the fumigant. Additional readings must then be taken until equilibrium has been achieved or the concentration falls below the standard concentration. Once initial equilibrium has been achieved it is not required at any other time.</p>	<p><i>Moved to section 8.5 Even methyl bromide distribution.</i></p> <p><b>8.5.1</b> The methyl bromide must be evenly distributed throughout the enclosure. This is verified by equilibrium.</p> <p><b>8.5.2</b> Equilibrium is achieved when the highest concentration reading is within 15% of the lowest concentration reading.</p> <p><b>Note:</b> Equilibrium result is expressed as a percentage and is equal to the highest concentration reading minus the lowest concentration reading, then divided by the lowest concentration reading, then multiplied by 100. The calculation for equilibrium is pictured:</p> $\frac{\text{Highest reading} - \text{Lowest reading}}{\text{Lowest reading}} \times 100 = \%$ <p><b>8.5.3</b> If the result of this calculation is more than 15%, equilibrium has not been achieved and additional time is needed to allow the methyl bromide to further distribute throughout the enclosure.</p> <p><b>Note:</b> Once equilibrium has been achieved it is not required at any other time.</p>	Reworded the equilibrium requirements for clarity.
<b>Monitoring fumigant concentration levels</b>	<b>7.3</b> Start time of the fumigation	<p><b>7.3</b> Start time of the fumigation</p> <p><b>7.3.1</b> The fumigation exposure period starts when:</p> <ul style="list-style-type: none"> <li>• all concentration readings are equal to or above the standard concentration</li> <li>• equilibrium has been established</li> </ul> <p><b>7.3.4</b> A concentration reading must be taken from all sampling tubes.</p> <p><b>7.3.5</b> The concentration readings must all be at or above the standard concentration (Table 1) or as specified in a treatment schedule.</p>	<p><i>Moved to section 8.6 Exposure period</i></p> <p><b>8.6.1</b> The fumigation exposure period must not start until:</p> <p><b>a)</b> all concentration readings are equal to or above the retention rate in the treatment schedule or, in the absence of specific retention information, the retention rates in Table 1, and</p> <p><b>b)</b> equilibrium has been achieved as per section 8.5 Even methyl bromide distribution.</p>	Moved the equilibrium calculations to its own section “8.5 even methyl bromide distribution”. The rest of the clause remains mainly unchanged.



Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0																
		<p><b>Table 1 Time of concentration readings after release and percentage of initial concentration dose rate required</b></p> <table border="1"> <thead> <tr> <th>Time after fumigant release</th> <th>Per cent of initial dose rate concentration</th> </tr> </thead> <tbody> <tr> <td>15 to 30 minutes</td> <td>85% or more</td> </tr> <tr> <td>30 minutes to 1 hour</td> <td>75% or more</td> </tr> <tr> <td>More than 1 hour</td> <td>70% or more</td> </tr> </tbody> </table> <p><b>7.3.6</b> If additional fumigant needs to be added before start point has been reached, the amount must be calculated by subtracting the lowest concentration reading from the initial dose rate and multiplying that by the volume of the enclosure. The formula for this is: (Initial dose rate – Lowest concentration reading) x Volume</p> <p><b>7.3.7</b> If more fumigant is added to the enclosure before start time is achieved, the time the injection of additional fumigant is completed becomes the new injection completion time for determining the required start time concentration.</p> <p><b>7.3.8</b> All initial concentration readings and the time they were taken must be recorded. This includes any readings taken prior to achieving start point.</p>	Time after fumigant release	Per cent of initial dose rate concentration	15 to 30 minutes	85% or more	30 minutes to 1 hour	75% or more	More than 1 hour	70% or more	<p><b>Table 1 Time of concentration readings after methyl bromide injection and required retention rate of initial dose rate.</b></p> <table border="1"> <thead> <tr> <th>Time after methyl bromide injection</th> <th>Retention rate of initial dose rate concentration</th> </tr> </thead> <tbody> <tr> <td>15 to 30 minutes</td> <td>85% or more</td> </tr> <tr> <td>30 minutes to 1 hour</td> <td>75% or more</td> </tr> <tr> <td>More than 1 hour</td> <td>70% or more</td> </tr> </tbody> </table> <p><b>8.6.2</b> Retention rates and standard concentrations must be determined based on actual dose rate applied.</p> <p><b>8.6.3</b> If additional methyl bromide needs to be added before start point has been reached, the amount must be calculated by subtracting the lowest concentration reading from the initial dose rate and multiplying that by the volume of the enclosure. Additional dose (g) = Enclosure volume (m<sup>3</sup>) x (Initial dose rate – Lowest concentration reading)</p> <p><b>8.6.4</b> If additional methyl bromide needs to be added before start has been reached and the formulation contains less than 100% methyl bromide, the amount must be calculated in accordance with section 8.2.4.</p> <p><b>8.6.5</b> If additional methyl bromide is added to the enclosure before the start of the exposure period, the time the injection of additional methyl bromide is completed becomes the new injection time for determining the required start time concentration.</p>	Time after methyl bromide injection	Retention rate of initial dose rate concentration	15 to 30 minutes	85% or more	30 minutes to 1 hour	75% or more	More than 1 hour	70% or more	
Time after fumigant release	Per cent of initial dose rate concentration																			
15 to 30 minutes	85% or more																			
30 minutes to 1 hour	75% or more																			
More than 1 hour	70% or more																			
Time after methyl bromide injection	Retention rate of initial dose rate concentration																			
15 to 30 minutes	85% or more																			
30 minutes to 1 hour	75% or more																			
More than 1 hour	70% or more																			
<b>Monitoring fumigant concentration levels</b>	<b>7.4</b> Minimum concentration levels	<p><b>7.4.1</b> A minimum concentration of fumigant must be maintained within the enclosure during the exposure period.</p> <p><b>7.4.2</b> The concentration of fumigant must not fall below the levels specified in Appendix 5: Concentrations for dose rates and times, or Appendix 6 where a treatment schedule requires a minimum gas retention of 80%.</p> <p><b>Note:</b> Fumigations for ISPM 15 require a minimum gas retention of 50% of the initial dose rate at the end of 24 hours.</p>	<i>Deleted a repetition of 8.5.6</i>	The parameters set in the treatment schedules are minimums for an effective treatment. If the temperature or gas readings are above the minimum parameters, the treatment has passed. We have deleted this section because it is just repeating Clauses contained in the temperature sections and in Clause 8.5.6. This is to avoid legal risk with repeated clauses.																
<b>Monitoring fumigant concentration levels</b>	<b>7.5</b> End of the exposure period	<p><b>7.5.1</b> The elapsed time between the start time and the end time of the fumigation must not be less than the prescribed exposure period.</p> <p><b>7.5.2</b> After the specified exposure period has elapsed concentration readings from all sampling tubes must be taken. The readings and the time they were taken must be recorded on the Record of Fumigation.</p> <p><b>7.5.3</b> The final concentration readings must all be at or above the standard concentration for the required exposure period. If any of the readings are below the standard concentration, the fumigation has failed unless the option of end point top-up is permitted.</p>	<p><i>Moved to section 8.6 Exposure period.</i></p> <p><b>8.6.6</b> The elapsed time between the start time and the end time of the fumigation must not be less than the exposure period prescribed in the treatment schedule.</p> <p><b>8.6.7</b> After the specified exposure period has elapsed, final concentration readings must be taken from all monitoring locations. The readings and the time they were taken must be recorded on the record of fumigation.</p> <p><b>8.6.8</b> At the end of the exposure period all concentration readings must be equal to or above the concentration in the treatment schedule or, in the absence of specific retention information, the standard concentrations in Appendix 4: Methyl bromide monitoring tables.</p>	Minor wording changes for consistency and clarity.																
<b>Topping-up to compensate for low concentrations</b>	<b>8.1</b> Topping-up	<b>8.1.1</b> If concentration monitoring indicates that fumigant levels are at risk of falling below the standard concentration, then the target of the fumigation may not be exposed to the minimum lethal dose needed to for effective treatment. Therefore, in some circumstances, the fumigator can add extra methyl bromide to increase the concentration levels to prevent the fumigation from failing.	<p><i>Moved to section 10.1 Topping-up during the exposure period.</i></p> <p><b>10.1.1</b> Additional methyl bromide may be added to the enclosure at any time during the exposure period if:</p> <p><b>a)</b> all the concentration readings are equal to or above the standard concentration ('A' in Figure 2), and</p> <p><b>b)</b> the lowest concentration reading is below the maximum top-up</p>	Amended to be a requirement rather than informative text. The topping up section has been redrafted to be clearer. Has changed into 3 sections: 10.1 Topping-up during the exposure period																

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
		<p><b>8.1.2</b> The top-up amount must be applied to the enclosure in the same way as the original dose, that is:</p> <ul style="list-style-type: none"> <li>• vaporised (see 6.1 Vaporising the methyl bromide)</li> <li>• fans on</li> <li>• PPE worn.</li> </ul> <p><b>8.1.3</b> After adding the top-up amount and allowing time for the extra fumigant to circulate, a concentration reading must be taken from the sampling tube that had the lowest reading to verify that the fumigant level is back above the standard concentration. <b>8.1.4</b> Equilibrium is NOT required. <b>8.1.5</b> Details must be recorded on the Record of Fumigation.</p>	<p><b>c)</b> the treatment schedule allows top-ups.</p> <p><b>10.1.2</b> If a top-up is performed during the original exposure period, no extension of the exposure period is required.</p> <p><b>10.1.3</b> Multiple top-ups are permitted during the exposure period.</p>	<p>10.2 Topping-up at the end of the exposure period</p> <p>10.3 Performing the top-up</p>
		<p>New Section</p>	<p><i>Moved to section 10.2 Topping-up at the end of the exposure period.</i></p> <p><b>10.2.1</b> If the lowest concentration reading at the end of the exposure period is below the standard concentration but not below the minimum concentration to allow top-up (Appendix 4: Methyl bromide monitoring tables), additional methyl bromide may be added to the enclosure.</p> <p><b>10.2.2</b> If a top-up is performed at the end of the exposure period, the fumigation must be extended for the minimum time specified in the treatment schedule. If no time extension is specified, the minimum time extension is four hours.</p> <p><b>10.2.3</b> After the minimum four-hour extension time, readings must be taken from all sampling lines and the concentrations must be equal to or above the standard concentration required for the original exposure period, if not, the fumigation has failed.</p> <p><b>10.2.4</b> Only one top-up at the end of the exposure period is permitted.</p> <p><b>10.2.5</b> Topping-up the concentration at the end of the exposure period is not permitted if:</p> <p><b>a)</b> the lowest concentration reading is below the minimum concentration to allow top-up (Appendix 4: Table 3 Methyl bromide monitoring table, fumigation phase); or</p> <p><b>b)</b> the treatment schedule prohibits topping-up.</p>	
<p><b>Topping-up to compensate for low concentrations</b></p>	<p><b>8.2</b> Calculating the top-up amount</p>	<p><b>8.2.1</b> To calculate the top-up amount, subtract the lowest concentration reading from the maximum top-up concentration and multiply by the volume of the enclosure (Figure 4). Figure 4 Methyl bromide minimum concentration requirement and top-up calculation guide A Standard concentration. B Minimum concentration to allow top-up. C Maximum top-up concentration.</p> <p><b>8.2.2</b> Adjust for chloropicrin if applicable. See 5.5 Chloropicrin.</p> <p><b>8.2.3</b> Round-up. See 5.6 Rounding. <b>8.3</b> Restrictions on topping-up</p>	<p><i>Moved to section 10.3 Performing the top-up</i></p> <p><b>10.3.1</b> The weight of methyl bromide for top-up must be calculated by subtracting the lowest concentration reading from the maximum top-up concentration (Appendix 4: Methyl bromide monitoring tables) and multiply by the volume of the enclosure.</p> <p>Top-up amount (g) = Enclosure volume (m<sup>3</sup>) x (C – Lowest concentration reading)</p> <p><b>10.3.2</b> The top-up amount for formulations that contain less than 100% methyl bromide and round up must be performed in accordance with section 8.2 Calculating the dose.</p> <p><b>10.3.3</b> The top-up amount must be injected into the fumigation enclosure in accordance with section 8.3 Injecting methyl bromide into the fumigation enclosure.</p> <p><b>10.3.4</b> When the additional methyl bromide has circulated, a concentration reading must be taken from the monitoring location that had the lowest reading to verify that the methyl bromide is back above the standard concentration.</p> <p><b>10.3.5</b> Top-up details (amount, time and concentration readings) must be recorded on the record of fumigation.</p> <p><b>10.3.6</b> If top-ups are performed equilibrium is not required.</p>	<p>Merged into one section “Performing the top-up”.</p> <p>Main change to topping up: Topping-up during the exposure cannot happen if any readings fall below the standard concentration. This is the original intent of topping up and in-line with the mechanics of successful fumigations.</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>Topping-up to compensate for low concentrations</b>	<b>8.3</b> Restrictions on topping-up	<p><b>8.3.1</b> Topping-up the concentration is NOT permitted if:</p> <ul style="list-style-type: none"> <li>• the lowest concentration reading is below the minimum concentration to allow top-up</li> <li>• the lowest concentration reading is above the maximum top-up concentration</li> <li>• the fumigation exposure period is less than 12 hours</li> <li>• it will result in exposure to excessive concentrations of methyl bromide that will adversely affect that commodity.</li> </ul> <p><b>8.3.2</b> Where the concentration readings at any of the sampling tubes, at any time, is below the minimum concentration to allow top-up, the fumigation has failed and topping-up is not permitted.</p>	<i>Merged into 10.3 Performing the top-up see above.</i>	See above
<b>Topping-up to compensate for low concentrations</b>	<b>8.4</b> Topping-up during the exposure period	<p><b>8.4.1</b> If a top-up is done during the normal exposure period, no extension of the exposure period, is required.</p> <p><b>8.4.2</b> Multiple top-ups are permitted during the exposure period.</p> <p><b>8.4.3</b> If a top-up is required during the second half of the exposure period it is indicative of excessive leakage rather than sorption by the commodity so the enclosure must be re-checked for leaks.</p>	<p><i>Moved to section 10.1 Topping-up during the exposure period.</i></p> <p><b>10.1.1</b> Additional methyl bromide may be added to the enclosure at any time during the exposure period if:</p> <p><b>a)</b> all the concentration readings are equal to or above the standard concentration (Appendix 4: Table 3 Methyl bromide monitoring table, fumigation phase) and</p> <p><b>b)</b> the lowest concentration reading is below the maximum top-up concentration (Appendix 4: Table 3 Methyl bromide monitoring table, fumigation phase) and</p> <p><b>c)</b> the treatment schedule allows top-ups.</p> <p><b>10.1.2</b> If a top-up is performed during the original exposure period, no extension of the exposure period is required.</p> <p><b>10.1.3</b> Multiple top-ups are permitted during the exposure period.</p>	Amended to be a requirement rather than informative text.
<b>Topping-up to compensate for low concentrations</b>	<b>8.5</b> Topping-up at the end of the exposure period	<p><b>8.5.1</b> If the lowest of the concentration readings taken at the end of the exposure period is below the standard concentration but equal to or above the minimum to allow top-up, extra fumigant must be added. See 8.2 Calculating the top-up amount.</p> <p><b>8.5.2</b> If a top-up is done at the end of the normal exposure period, the fumigation must be extended for at least another four hours to allow time for the extra fumigant to take effect.</p> <p><b>8.5.3</b> Only one extension of the exposure period is allowed. If, at the end of the extended period, the lowest reading is below the standard concentration as specified for the original exposure period, the fumigation has failed.</p>	<p><i>Moved to section 10.1 Performing the top-up.</i></p> <p><b>10.3.1</b> The weight of methyl bromide for top-up must be calculated by subtracting the lowest concentration reading from the maximum top-up concentration (Appendix 4: Methyl bromide monitoring tables) and multiply by the volume of the enclosure. Top-up amount (g) = Enclosure volume (m<sup>3</sup>) x (C – Lowest concentration reading)</p> <p><b>10.3.2</b> The top-up amount for formulations that contain less than 100% methyl bromide and round up must be performed as per section 8.2 Calculating the dose.</p> <p><b>10.3.3</b> The top-up amount must be injected into the fumigation enclosure as per section 8.3 Injecting methyl bromide into the fumigation enclosure.</p> <p><b>10.3.4</b> When the additional methyl bromide has circulated, a concentration reading must be taken from the monitoring location that had the lowest reading to verify that the methyl bromide is back above the standard concentration.</p> <p><b>10.3.5</b> Top-up details (amount, time and concentration readings) must be recorded on the record of fumigation.</p> <p><b>10.3.6</b> If top-ups are performed equilibrium is not required.</p>	Reworded for consistency and clarity.
<b>Ventilating the enclosure</b>	<b>9.1</b> Threshold limit value—time-weighted average (TLV-TWA)	<p><b>9.1.1</b> The enclosure must be ventilated until the concentration of fumigant within the enclosure falls below the TLV-TWA. The TLV-TWA is 5 ppm unless a lower concentration is imposed by the relevant authorities in the jurisdiction in which the fumigation takes place.</p> <p><b>9.1.2</b> The equipment used for measuring TLV-TWA must be fit for purpose and capable of accurately measuring the actual concentration, not just the presence, of methyl bromide in the range of 1 to 20 ppm.</p>	<p><i>Moved to section 11.1 Threshold limit value (TLV).</i></p> <p><b>11.1.1</b> The TLV is 5 parts per million (ppm) for methyl bromide unless a lower concentration is imposed by the relevant authorities in the jurisdiction where the fumigation takes place or the consignment destination.</p> <p><b>11.1.2</b> The equipment used for measuring TLV must be able to measure the actual concentration, not just the presence of methyl bromide, to at least 1 ppm.</p>	Minor wording changes for consistency and clarity

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
		<p><b>9.1.3</b> If stain tubes are used, they must be used in conjunction with the sampling pump specified by the manufacturer.</p> <p><b>9.1.4</b> If electronic instruments are used they must be calibrated and serviced in accordance with the manufacturer's instructions.</p>	<p><b>11.1.3</b> If stain tubes are used to detect methyl bromide, they must be used:</p> <p><b>a)</b> in accordance with the manufacturer's instructions; and</p> <p><b>b)</b> in conjunction with the sampling pump specified by the manufacturer; and</p> <p><b>c)</b> before the expiry date.</p>	
<b>Ventilating the enclosure</b>	<b>9.2</b> Releasing the fumigant from the enclosure	<p><b>9.2.1</b> At the end of the exposure period the fumigant must be fully ventilated from the enclosure in a controlled and safe manner.</p> <p><b>9.2.2</b> An assessment of the risks must be done to manage the ventilation process so that unprotected personnel in the vicinity are not exposed to unsafe levels of fumigant. The assessment must take into account:</p> <ul style="list-style-type: none"> <li>• prevailing wind direction</li> <li>• location and proximity of unprotected personnel</li> <li>• establishment of a temporary buffer zone around the enclosure that is sufficient to prevent unprotected personnel in the vicinity from being exposed to unsafe levels of methyl bromide</li> <li>• prevention of unprotected personnel entering the buffer zone during ventilation.</li> </ul> <p><b>9.2.3</b> Unprotected personnel are not permitted to enter the risk area until the fumigator verifies that concentration in the area and throughout the enclosure is at or below the TLV-TWA.</p> <p><b>9.2.4</b> If the consignment is fumigated in the shipping container(s) that will be used to transport the goods, then each container must be checked individually to verify gas clearance below TLV-TWA.</p>	<p><i>Moved to section 11.2 Releasing the methyl bromide from the enclosure.</i></p> <p><b>11.2.1</b> At the end of the exposure period, the methyl bromide must be fully ventilated from the enclosure in a controlled and safe manner.</p> <p><b>11.2.2</b> A risk assessment must be performed to manage the ventilation process and ensure it is safe by considering:</p> <p><b>a)</b> prevailing wind direction</p> <p><b>b)</b> location and proximity of unprotected personnel</p> <p><b>c)</b> extension of the exclusion zone (see section 5.1 Establish an exclusion zone) around the enclosure if required to prevent unprotected personnel in the vicinity from being exposed to methyl bromide levels above the TLV.</p> <p><b>11.2.3</b> Personnel who are not wearing PPE (as per section 2.3 Personal protective equipment (PPE)) are not permitted to enter the exclusion zone until the fumigator-in-charge verifies the concentration in the area and throughout the enclosure is at or below the TLV.</p> <p><b>11.2.4</b> The enclosure must be ventilated until the concentration of methyl bromide within the enclosure remains at or below the TLV.</p> <p><b>11.2.5</b> If the consignment is fumigated in the sea container(s) that will be used to transport the goods, each container must be checked individually to verify concentration at or below TLV.</p> <p><b>11.2.6</b> If the consignment is fumigated in an un-sheeted sea container, the sea container must not be moved until the methyl bromide concentration inside the enclosure is at or below the TLV</p> <p><b>11.2.7</b> If the consignment is a perishable commodity fumigation, packed in cartons and/or bags that have been opened during fumigation, the cartons and/or bags can only be closed once the methyl bromide concentration inside the cartons and/or bags is under the TLV.</p> <p><b>11.2.8</b> The TLV readings and the time they were taken must be recorded on the record of fumigation.</p>	<p>Minor wording changes for consistency and clarity.</p> <p>Requirement to record on the ROF added to this section. Documentation errors are an area of high non-compliance. Added for clarity.</p>
<b>Ventilating the enclosure</b>	<b>9.3</b> Releasing the consignment from the fumigator's control	<p><b>9.3.1</b> The consignment can only be released from the fumigators control once the following conditions have been met:</p> <ul style="list-style-type: none"> <li>• The fumigation has been performed in accordance with requirements.</li> <li>or</li> <li>• The fumigation has failed and it is subsequently unsuitable for further treatment with methyl bromide, requiring the consignment to be sent for an alternative treatment option. and</li> <li>• The fumigant concentrations have been verified to the TLV-TWA or below.</li> </ul> <p><b>9.3.2</b> The TLV-TWA readings and the time they were taken must be recorded.</p>	<p><i>Moved to section 11.3 Releasing the consignment from the fumigator-in-charge's control.</i></p> <p><b>11.3.1</b> Following a fumigation, the consignment can only be released from the control of the fumigator-in-charge once the following requirements have been met:</p> <p><b>a)</b> the fumigation complies with the requirements of this methodology and the methyl bromide concentration has been verified at or below the TLV, or</p> <p><b>b)</b> the fumigation has failed, and it is subsequently unsuitable for further fumigation with methyl bromide and the methyl bromide concentration has been verified at or below the TLV.</p>	<p>Minor wording changes for consistency and clarity.</p> <p>Clause 9.3.2 moved under section 11.2</p>
<b>Documentation</b>	<b>10.1</b> Record of Fumigation	<b>10.1.1</b> The fumigator must record sufficient information to demonstrate that the fumigation complied with these requirements.	<p><i>Moved to 12.1 Retainment of fumigation documents and 12.2 Record of fumigation.</i></p> <p><b>12.1.1</b> The treatment provider must keep a copy of all fumigation documentation for a minimum of two years.</p>	Minor wording changes for consistency and clarity

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<b>12.2.1</b> A record of fumigation must be produced to demonstrate the fumigation complied with the requirements of this methodology.	
<b>Documentation</b>	<b>10.1</b> Record of Fumigation	<b>10.1.2</b> At a minimum it must include the following: <ul style="list-style-type: none"> <li>• job identification</li> <li>• client or customer name</li> <li>• start date of the fumigation</li> <li>• location—the site address where the fumigation was performed</li> <li>• a description of the consignment</li> <li>• the target of the fumigation—why is the fumigation being performed</li> <li>• consignment identification—container number(s), bill of lading or other means to clearly identify the consignment</li> <li>• a declaration that the consignment is suitable for fumigation with the requirements set out at in section 1 Prior to Fumigation.</li> <li>• type of enclosure</li> <li>• enclosure volume</li> <li>• chamber load factor—expressed as % of chamber volume—this is only for perishables <ul style="list-style-type: none"> <li>• the specified dose rate and exposure period</li> </ul> </li> <li>• the forecast minimum temperature and any adjustment made for temperatures below 21 °C (and commodity temperature readings for perishables)</li> <li>• the dose—amount of fumigant to be used and the actual dose used</li> <li>• the time the injection of the dose into the enclosure was completed</li> <li>• the concentration readings from each sampling tube and the time they were taken</li> <li>• the TLV–TWA readings and the time they were taken</li> <li>• the name and signature of the fumigator-in-charge.</li> </ul>	<p><i>Moved to 12.2 Record of fumigation.</i></p> <p><b>12.2.5</b> At a minimum the record of fumigation must include:</p> <ul style="list-style-type: none"> <li><b>a)</b> treatment provider identification</li> <li><b>b)</b> client name</li> <li><b>c)</b> start date and time of the fumigation</li> <li><b>d)</b> location – the site address where the fumigation was performed</li> <li><b>e)</b> a description of the consignment</li> <li><b>f)</b> the target of fumigation</li> <li><b>g)</b> consignment identification - container number(s), bill of lading, silo/shed number or other means to clearly identify the consignment</li> <li><b>h)</b> a declaration that the consignment complies with the treatment schedule, import conditions, and all requirements of the Methyl Bromide Fumigation Methodology</li> <li><b>i)</b> type of enclosure used</li> <li><b>j)</b> enclosure volume</li> <li><b>k)</b> the specified treatment schedule - dose rate, exposure period and temperature</li> <li><b>l)</b> dose rate used – the dose rate used for the fumigation (if dose compensation for temperature variation is applied the temperature adjusted dose rate is recorded)</li> <li><b>m)</b> calculated dose – dose rate used multiplied by the enclosure volume, expressed as weight of methyl bromide</li> <li><b>n)</b> amount of methyl bromide applied – the actual volume of methyl bromide injected in the enclosure, expressed as weight of methyl bromide</li> <li><b>o)</b> the time the methyl bromide injection into the enclosure was complete</li> <li><b>p)</b> the concentration readings from each concentration monitoring location and the time they were taken</li> <li><b>q)</b> result of the equilibrium calculation</li> <li><b>r)</b> serial number of the gas concentration monitoring device(s) used (minimum last 4 digits of the serial number)</li> <li><b>s)</b> the TLV readings and the time and date they were taken</li> <li><b>t)</b> the name and signature of the fumigator-in-charge</li> <li><b>u)</b> initial or signature of the fumigator at each concentration reading stage and TLV reading.</li> </ul> <p><b>12.2.6</b> If the fumigation is an ambient temperature fumigation ( section 6.1 Ambient temperature fumigations), the forecast minimum temperature must be recorded on the record of fumigation.</p> <p><b>12.2.7</b> If the fumigation is a controlled temperature fumigation ( section 6.2 Controlled temperature fumigations), the minimum temperature achieved within the enclosure must be recorded on the record of fumigation</p> <p><b>12.2.8</b> If the fumigation is a perishable commodity fumigation or if the temperature of the goods must be verified ( section 6.3 Perishable commodity fumigation), the temperature of the goods must be recorded on the record of fumigation.</p>	<p>New:</p> <p>Serial number of the gas concentration monitoring device(s) used (minimum last 4 digits of the serial number)</p> <p>Included a requirement for the temperature as specified by the treatment schedule.</p> <p>Included a requirement for the equilibrium calculation result.</p> <p>Included a requirement that additional doses have their time and amount be recorded.</p> <p>Other changes:</p> <p>For clarity where the item was ‘where applicable’ this has been clarified to the situations where they are applicable. (clauses 12.1.6 – 12.1.9)</p>

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>12.9</b> If the fumigation is a perishable commodity fumigation (section 6.3 Perishable commodity fumigation), the load factor and retention rate must be recorded on the record of fumigation.</p> <p><b>12.2.10</b> If additional fumigant was added to the fumigation (in accordance with section 10 Topping up the methyl bromide levels), the top-up amount, time and concentration must be recorded on the record of fumigation.</p> <p><b>12.2.11</b> If additional fumigant was added (in accordance with section 8.6), the additional amount and time injected must be recorded on the record of fumigation.</p>	
<b>Documentation</b>	<b>10.1</b> Record of Fumigation	<b>Note:</b> See Appendix 1: Example record of fumigation for an example Record of Fumigation.	<p><i>Moved to 12.2 Record of fumigation.</i></p> <p><b>Note:</b> An example record of treatment is provided at Appendix 1: Example record of fumigation and Appendix 2: Example record of fumigation perishable commodity.</p>	Template ROF's and Certificates will be completed once the document text is finalised.
<b>Documentation</b>	<b>10.1</b> Record of Fumigation	<b>10.1.3</b> The Record of Fumigation must be completed on the fumigation site as the tasks are performed and copies must be maintained for audit purposes for a minimum of two years. <b>10.1.4</b> Recording of false or misleading information is not permitted under any circumstances.	<p><i>Moved to 12.2 Record of fumigation</i></p> <p><b>12.2.2</b> The record of fumigation must be completed on the fumigation site as the tasks are performed.</p> <p><b>12.2.3</b> The record of fumigation must be retained by the treatment provider for a minimum of two years.</p> <p><b>12.2.4</b> False or misleading information must not be recorded on a record of fumigation.</p>	Minor wording changes for consistency and clarity.
<b>Documentation</b>	<b>10.2</b> Fumigation treatment certificate	<b>10.2.1</b> A fumigation treatment certificate can be issued by a suitably accredited person once they are satisfied that the fumigation has been performed in accordance with the requirements.	<p><i>Moved to 12.3 Fumigation treatment certificate.</i></p> <p><b>12.3.1</b> A fumigation treatment certificate is issued once the fumigator-in-charge determined the fumigation has complied with requirements of this methodology.</p> <p><b>12.3.2</b> False or misleading information must not be recorded on a fumigation treatment certificate.</p>	<p>Minor wording changes for consistency and clarity.</p> <p>12.2.2 Clause added for enforceability purposes.</p>
<b>Documentation</b>	<b>10.2</b> Fumigation treatment certificate	<p><b>10.2.2</b> All sections of the fumigation certificate are mandatory and must be filled out correctly to ensure the certificate can be accepted.</p> <p><b>10.2.3</b> An example fumigation certificate is provided at Appendix 3: Example fumigation certificate.</p>	<p><i>Moved to 12.3 Fumigation treatment certificate.</i></p> <p><b>12.3.3</b> At a minimum the fumigation treatment certificate must include the following:</p> <ul style="list-style-type: none"> <li>a) treatment provider's letterhead including name and physical address</li> <li>b) treatment provider's identification (AEI if an AEI is required by the treatment scheme or import conditions)</li> <li>c) certificate number</li> <li>d) name of fumigant</li> <li>e) target of fumigation</li> <li>f) description</li> <li>g) quantity</li> <li>h) consignment link (such as container number, bill of lading, invoice number)</li> <li>i) country or origin</li> <li>j) port of loading</li> <li>k) country of destination</li> <li>l) date and time fumigation commenced</li> <li>m) date and time fumigation completed</li> <li>n) place of fumigation (site registration number if applicable)</li> <li>o) type of enclosure used</li> <li>p) treatment schedule [prescribed dose rate/ specified dose rate (g/m<sup>3</sup>)]</li> <li>q) exposure period (hours)</li> <li>r) forecast minimum temperature (°C) or minimum temperature achieved in the enclosure or commodity temperature (if applicable)</li> </ul>	Minimum requirements added instead of relying on the certificate template. Serial numbers, sequence, and some amendments to the enlisted minimum requirements.

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
			<p><b>s)</b> applied dose rate (g/m<sup>3</sup>)</p> <p><b>t)</b> final TLV reading (ppm)</p> <p><b>u)</b> a declaration that the consignment complies with the treatment schedule, import conditions, and all requirements of the Methyl Bromide Fumigation Methodology</p> <p><b>v)</b> the signature of the fumigator-in-charge and date of signing</p> <p><b>w)</b> date the certificate was endorsed and issued.</p> <p>Note: An example fumigation treatment certificate is provided at Appendix 3: Example fumigation treatment certificate</p>	
<b>Documentation</b>	<b>10.2</b> Fumigation treatment certificate	<b>10.2.4</b> The fumigation certificate travels with the consignment to state that it has been effectively treated for QPS purposes.	<p><b>12.3.4</b> The treatment provider must make all fumigation documentation available on request, by the relevant authorities, for audit and registration purposes.</p> <p><b>12.3.5</b> The fumigation treatment certificate must be clearly linked to the consignment.</p>	<p>Minor wording changes for consistency and clarity.</p> <p>12.2.4 and 12.2.5 Clause added for enforceability purposes.</p>
<b>Glossary</b>	Definitions	NEW	Ambient temperature fumigation: When the enclosure being fumigated is subject to environmental ambient temperatures or outdoors.	New
<b>Glossary</b>	Definitions	Buffer zone: The area around the enclosure, outside of which, the concentration levels of methyl bromide should not exceed the TLV-TWA during ventilation.	Deleted	
<b>Glossary</b>	Definitions	NEW	Carton: Box, often cardboard or polystyrene, in which perishable commodities are packed for transport and sale.	New
<b>Glossary</b>	Definitions	NEW	Concentration sampling tube: A small diameter tube used to draw a sample of gas/air mixture from within a fumigation enclosure to measure the methyl bromide concentration.	New
<b>Glossary</b>	Definitions	NEW	Controlled temperature fumigation: When an artificial heat source is used to heat and maintain the temperature of an enclosure during a fumigation.	New
<b>Glossary</b>	Definitions	Dosage: The cumulative concentration of fumigant in the enclosure over the exposure period. Also referred to as the Concentration by Time Product (CT Product) normally expressed as gram hours per cubic metre.	Deleted	Term not in this version of the document
<b>Glossary</b>	Definitions	The prescribed concentration of fumigant to be used per unit of volume and the exposure period.	Dose rate: The prescribed concentration of methyl bromide to be used per unit of volume and the exposure period (temperature adjusted if applicable).	Amended for more clarity
<b>Glossary</b>	Definitions	Any gas-tight space intended to contain sufficient concentrations of fumigant for a period of time. Common examples of fumigation enclosures used for QPS fumigations are sealed shipping containers, gas-proof sheets sealed to an impervious floor and purpose-built chambers	Enclosure: Any gas-tight space intended to contain sufficient concentrations of methyl bromide for a period of time. Common examples of fumigation enclosures used for QPS fumigations are (but not limited to) un-sheeted sea containers, semi-permanent or permanent structures, sheeted enclosures, vessel holds, silos and bunkers.	Amended for more clarity
<b>Glossary</b>	Definitions	Free air space: Empty space in the enclosure between, above or around a commodity	Deleted	Term not in this version of the document

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Glossary	Definitions	NEW	Exclusion Zone: The area around the enclosure to which access is restricted to personnel wearing personal protective equipment	New
Glossary	Definitions	NEW	Fit for purpose: Equipment that is appropriate for the way it is being used i.e. capable of measuring methyl bromide or temperature specifically and in the concentration and ranges necessary to meet the requirements of this methodology.	New
Glossary	Definitions	NEW	Fumigation chamber: A gas-tight fumigation enclosure with an inbuilt extraction system. All requirements for fumigation chambers specified in section 4.3 Fumigation chambers	New
Glossary	Definitions	NEW	Fumigation documentation: Documents and records associated with particular fumigations that is not a record of fumigation. May be hardcopy or softcopy.	New
				Not actually new it's in 2.0
Glossary	Definitions	A sheet (or tarpaulin) that is made of material impervious to the fumigant used to create a temporary fumigation enclosure.	A sheet (or tarpaulin) used to create a sheeted enclosure that is made of material impermeable to methyl bromide.	Updated to remove ambiguity
Glossary	Definitions	NEW	Fumigator: An individual responsible for conducting fumigation activities under the supervision of the fumigator-in-charge.	New
Glossary	Definitions	NEW	Fumigator-in-charge: The licenced and/or accredited individual that is responsible for the conduct of the fumigation at the time specific fumigation activities are undertaken.	New
Glossary	Definitions	NEW	Gas concentration monitoring location: The specified location where gas must be drawn from for the purpose of determining the gas concentration at that location. This is location where sampling tubes or gas concentration sampling equipment is placed.	New
Glossary	Definitions	NEW	Goods: Goods includes an animal, a plant, a sample or specimen, a pest, mail or any other article, substance or thing (including, but not limited to, any kind of moveable property).	New
Glossary	Definitions	NEW	Good working order : State of an item, system or equipment is deemed to be functioning properly, without significant defects or impairments that hinder its intended operations or performance.	New
Glossary	Definitions	ISPM15: International Standards for Phytosanitary Measures No. 15 – Regulation of wood packaging material in International trade	Deleted	Term not in this version of the document
Glossary	Definitions	NEW	Impermeable package and wrappings: Intact and solid plastic films and wrappings that prevent or impede gas exchange.	New



Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
Glossary	Definitions	NEW	Manufacturer's instructions: Specific details on equipment produced by the equipment manufacturer. May include instruction manuals, operating instructions, conditions of use or calibration information.	New
Glossary	Definitions	Permeability: The rate at which a substance (such as methyl bromide) passes through a material (such as a fumigation sheet).	Deleted	Term not in this version of the document
Glossary	Definitions	Record of fumigation: A document that records the relevant information to demonstrate the fumigation complied with requirements.	Record of fumigation: An official document or electronic record that records the information of section 10 to demonstrate the fumigation complied with requirements.	Minor wording changes for consistency, enforceability and clarity.
Glossary	Definitions	NEW	Risk Assessment: An assessment performed and recorded according to any instructions on the product label, safety data sheet or jurisdictional licence requirements. In the absence of this, a visual inspection to meet the requirements of this methodology that the fumigator-in-charge can verbally describe.	New
Glossary	Definitions	Risk area: The area around the enclosure to which access is restricted to personnel wearing personal protective equipment	Deleted	Term not in this version of the document
Glossary	Definitions	NEW	Risk Assessment: An assessment performed and recorded according to any instructions on the product label, safety data sheet or jurisdictional licence requirements. In the absence of this, a visual inspection to meet the requirements of this methodology that the fumigator-in-charge can verbally describe.	New
Glossary	Definitions	Sampling tube: A small diameter tube used to draw a sample of gas/air mixture from within a fumigation enclosure to measure the fumigant concentration.	Renamed: Concentration sampling tube: A small diameter tube used to draw a sample of gas/air mixture from within a fumigation enclosure to measure the methyl bromide concentration.	Renamed
Glossary	Definitions	Sheet fumigation: A process of creating a gas-tight enclosure by covering/enclosing the commodities to be fumigated under a gas-proof sheet.	Renamed: Sheeted enclosure: An enclosure created under a gas-proof sheet that is covering/enclosing the commodities to be fumigated.	Renamed
Glossary	Definitions	NEW	Sheeted stack: Any sheeted enclosure over free standing goods.	New
Glossary	Definitions	Shipping container: Standardised transportation units that can be moved from one mode of transport to another without needing to unload the contents	Renamed: Sea Container: Standardised transportation units that can be moved from one mode of transport to another without needing to unload the contents.	Consistent with IPPC language
Glossary	Definitions	Sorption/sorptive: A physical and chemical process by which one substance becomes attached to another. De-sorption is the reversal of this process.	Deleted	Term not in this version of the document
Glossary	Definitions	Standard concentration: The fumigant Standard concentration: The fumigant concentration below which the fumigation will not be effective unless additional fumigation is added to the enclosure to compensate.	Standard concentration: The methyl bromide concentration below which the fumigation will not be effective unless additional fumigation is added to the enclosure to compensate	Specified methyl bromide
Glossary	Definitions	Target of the fumigation The target of the fumigation may be the commodity, packaging material or both.	Target of fumigation: The specific object or area that is intended to be treated through the fumigation process. The target of fumigation may be the commodity, packaging material, container, or conveyance or combination of these.	Renamed and elaborated for clarity

Version 2.0 section title	Version 2.0 requirement	Version 2.0 wording	Change in version 3.0	Reason for the change in version 3.0
<b>Glossary</b>	Definitions	Threshold limit value— time-weighted average (TLV–TWA): TLV–TWA is the maximum concentration of fumigant that a person can be repeatedly exposed to in the workplace without harmful effects. This figure is based on an 8-hour day, 40-hour working week	Renamed: Threshold limit value (TLV): TLV is the maximum concentration of methyl bromide that a person can be repeatedly exposed to in the workplace without harmful effects. This figure is based on an 8-hour day, 40-hour working week.	Renamed
<b>Glossary</b>	Definitions	NEW	Timber: Processed wood harvested from trees, often processed into beams and planks.	New
<b>Glossary</b>	Definitions	New	Timber products: Any product made from timber or wood.	New
<b>Glossary</b>	Definitions	NEW	Treatment provider: An entity or company that is responsible for the effective conduct of a QPS treatment.	New
<b>Glossary</b>	Definitions	NEW	Treatment schedule: Specific treatment rates, exposure period and rules as imposed by the relevant authority – usually the importing jurisdiction.	New
<b>Glossary</b>	Definitions	NEW	Treatment temperature: The temperature at which the applied dose rate was calculated.	New
<b>Glossary</b>	Definitions	NEW	Vacuum chamber: A rigid enclosure from which air and other gases are removed by a vacuum pump. This results in a low-pressure environment within the chamber.	New
<b>Glossary</b>	Definitions	NEW	Verifiable weather source: Reliable source of weather data that can be independently confirmed and validated at audit.	New