Australian Government

Department of Agriculture and Water Resources

BMSB Treatment Compliance Requirements

SEPTEMBER 2019

Introduction

Purpose

This session is intended to provide details on the compliance requirements specific to the BMSB treatment methodologies:

- Sulfuryl Fluoride (SF)
- Methyl Bromide (MB)
- Heat Treatment (HT)

We are not imposing anything that is not detailed in the methodologies – these are the minimum requirements that have to be met according to the departmental requirements

Introduction

We will not cover off everything in the methodologies

We will focus on the key mandatory elements as well as the verification and documentation requirements

The requirements in the methodologies are there to ensure that BMSB treatments are effective and are verified by taking and recording the key treatment elements – temperatures or fumigant concentrations

It’s not always possible to check if pests have been killed so we rely on the fumigation being done correctly

Introduction

It is recommended that all treatment providers also read treatment methodologies relevant to the BMSB treatments they are registered to conduct.

The department has a guide document that relates to the MB fumigation methodology that provides additional information to help meet the requirements. Much of this guide is also relevant to SF fumigations, so SF treatment providers may wish to read this also.

Fumigation Principles for MB & SF Fumigation

Fumigation

Biosecurity fumigations are conducted to kill pests that may be in the goods/consignments

To ensure effective treatments, adequate fumigant must be added to and maintained within the enclosure

The key parameters of biosecurity fumigations must be verified and documented to confirm that the fumigation was successful

Key factors for fumigation

Concentration

- The amount of gas available to act on the pest

Time

- The toxic effect is not immediate, it is cumulative over time
- Time is needed to reach all areas of the goods and where necessary to penetrate into the commodity

Temperature

- Low temperatures can slow the take up rate by the pest
- Condensation can occur at higher concentrations and low temperatures
  - Reduces the available fumigant
  - May damage the commodity

Concentration

Dose rate

- The minimum concentration to be added to the enclosure

Dose

- The amount of gas needed to achieve the dose rate

  Dose (g) = Dose rate (g/m^3) x Volume (m^3)

- Volume of the enclosure
  - Use the internal volume for chambers or un-sheeted containers
  - Measure the external dimensions for sheeted enclosures

  Volume (m^3) = Length (m) x Width (m) x Height (m)

Time

The **exposure period** is the length of time the pest must be exposed to a minimum concentration of fumigant

Start of the exposure period

- Fumigant concentration is above the minimum required
- The fumigant is evenly distributed

End of the exposure period

- The specified length of time has elapsed
- The final concentration is equal to or above the minimum required

Temperature compensation

BMSB dose rates do not require any adjustments for temperature

- SF and MB: Minimum temperature of 10°C and no option to increase the dose rate for temperatures below 10°C
- No reduction of the dose rate for temperatures above 10°C

You must verify that the official forecast minimum temperature is above 10°C for the duration of the fumigation to be able to conduct BMSB SF or MB fumigations

Fumigation temperature

Where forecast minimum temperature for the duration of the fumigation is below 10°C, you can:

- Use artificial heat to raise the enclosure above 10°C, or
- Move the fumigation inside a heated building
- **If these options are not available you cannot conduct BMSB SF or MB fumigations**

Where artificial heating is applied or the fumigation is conducted inside a heated building, temperature sensors and data loggers must be used to verify the temperature inside the enclosure is maintained above 10°C for the duration of the fumigation

Consignment suitability

Target of the fumigation

BMSB is a hitchhiker pest, therefore the target of BMSB fumigations is both the commodity and packing present at the time of fumigation

For BMSB treatments:

- Commercial packing that is applied during manufacture is not required to be opened/slashed
- Shipping packing is required to be opened, slashed or otherwise adjusted so the fumigant can access everywhere BMSB may be

Exposure to the fumigant

BMSB must be exposed to a lethal dose of fumigant

- Overwintering BMSB are active adults and ingest more fumigant than early life stages - eggs
- This is the reason the BMSB fumigation dose rates are relatively low

The fumigant must be able to circulate freely

- Separation is required between individual items / pallets

The fumigant must be able to reach the locations that BMSB may be able to access

- Remove or cut any plastic wrapping that may restrict access to these laocations

Exposure to the fumigant

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Exposure to the fumigant

Exposure to the fumigant

Preparing to fumigate

Safety and risk area

The MB & SF methodologies include details on fumigator safety and risk area for the safety of unprotected personnel in the vicinity.

Any local or domestic requirements or legislation take precedence and the methodology requirements should be used as a minimum.

Types of enclosure

Chambers

Un-sheeted shipping containers

Sheeted enclosures (stacks)

- Suitable fumigation floor
- Impervious sheet in good condition
- Sand snakes or other method to seal the sheet to the floor

Setting up the enclosure

Supply pipes and fans

- At least one per container
- Recommend use more than one when fumigating larger stacks
- Multiple containers under one sheet must have at least one supply pipe and fan in each container.

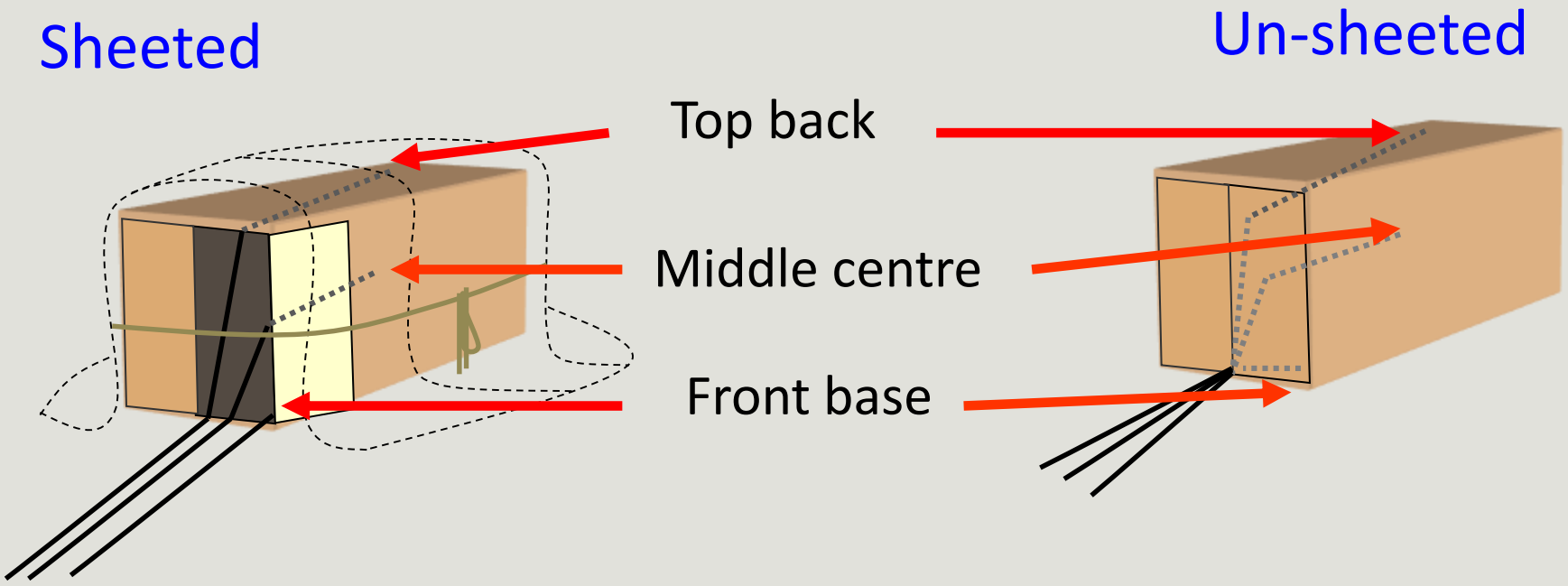
Concentration sampling tubes

- At least 1 for enclosures of 30 m^3 or less
- At least 3 sampling tubes for enclosures more than 30 m^3
- At least 1 sampling tube is required in each container for multiple containers under one sheet

Sampling tube placement

Enclosures > 30 m^3 in volume must have a minimum of 3 sampling tubes

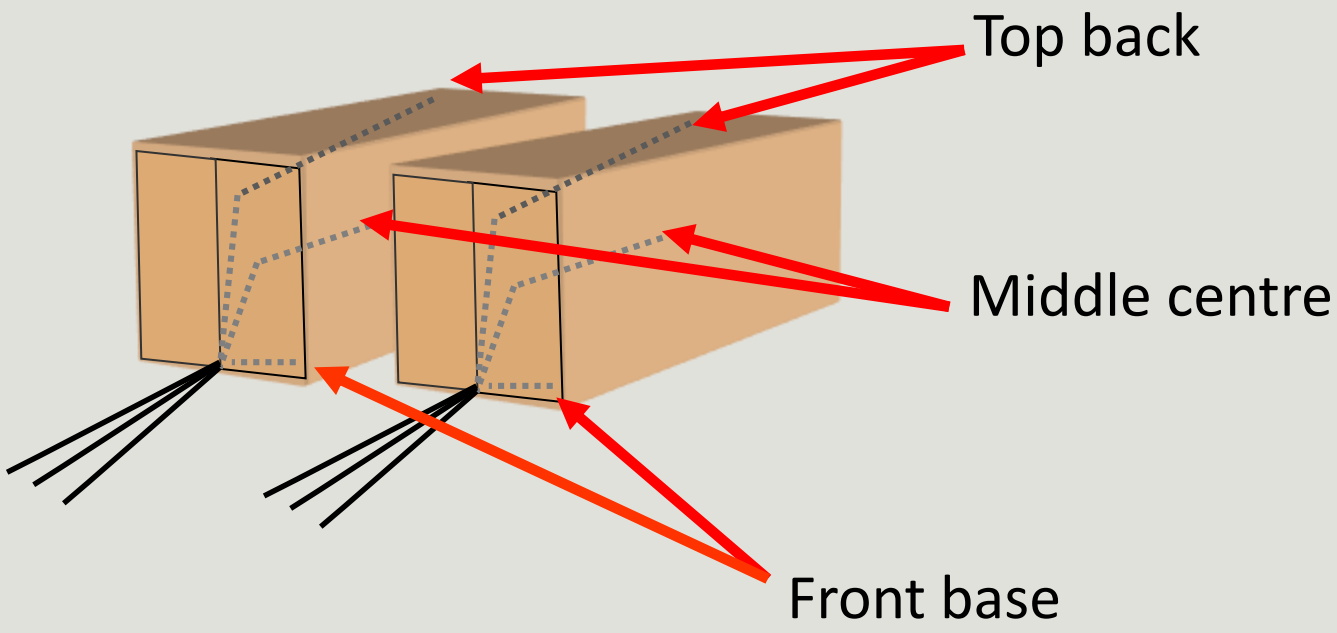
- A 20 foot container is normally about 32 m^3



Sampling tube placement

More than one un-sheeted container:

- Each container is a separate fumigation so a minimum of 3 sampling tubes is required in each container
- Each container also requires it's own record of fumigation



Documenting the fumigation

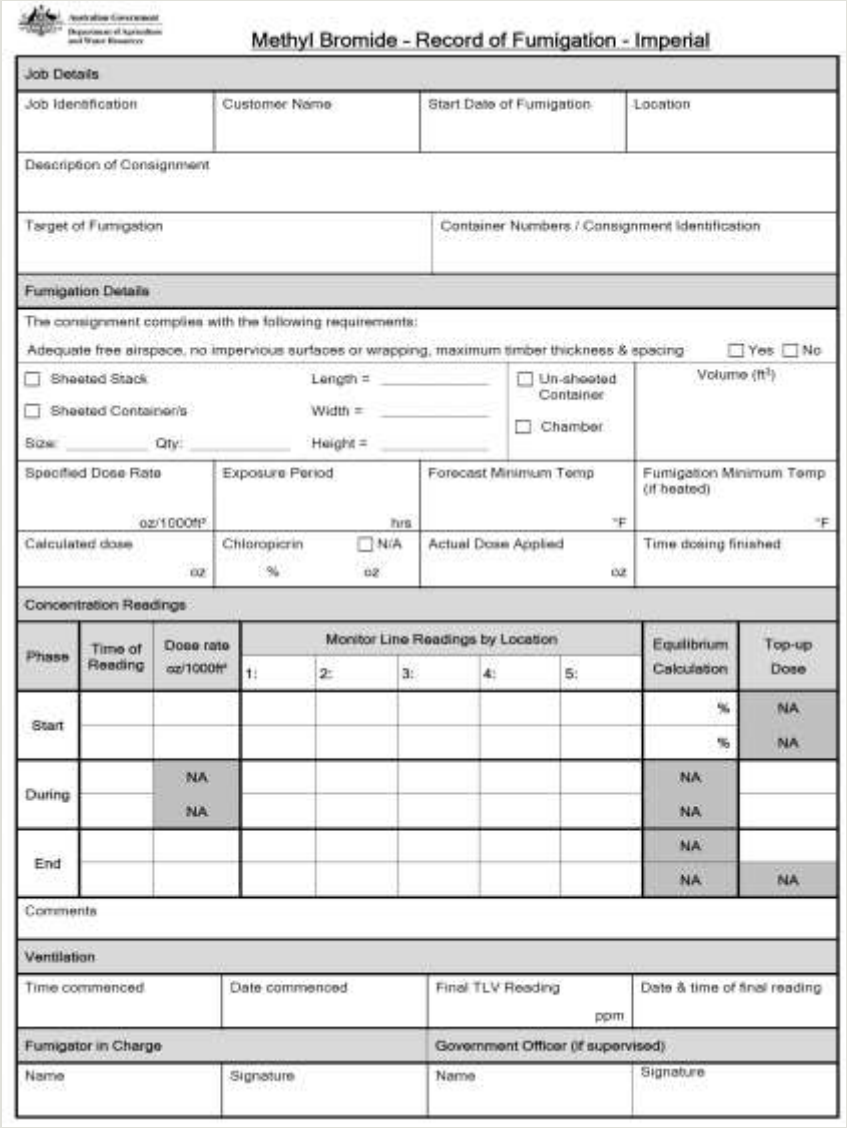
Documentation

You need to measure and record information about each fumigation

- Job details
- Enclosure details
- Treatment requirements and specifications
- Concentration readings and the times taken
- Ventilation and TLV checking
- Identification of fumigator responsible

The Record of Fumigation must be completed on-site

Records of fumigation



Methyl Bromide - Record of Fumigation - Imperial

Job Details

Job Identification	Customer Name	Start Date of Fumigation	Location

Description of Consignment

Target of Fumigation	Container Numbers / Consignment Identification

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack Length = _____

☐ Sheeted Container/s Width = _____

Size: _____ Qty: _____ Height = _____

☐ Un-sheeted Container

☐ Chamber

Volume (ft^3)

Specified Dose Rate	Exposure Period	Forecast Minimum Temp	Fumigation Minimum Temp (if heated)
oz/1000ft^3	hrs	°F	°F

Calculated dose	Chloropicrin ☐ N/A	Actual Dose Applied	Time dosing finished
oz	% oz	oz	

Concentration Readings

Phase	Time of Reading	Dose rate oz/1000ft^3	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
		NA						NA	
End								NA	
								NA	NA

Comments

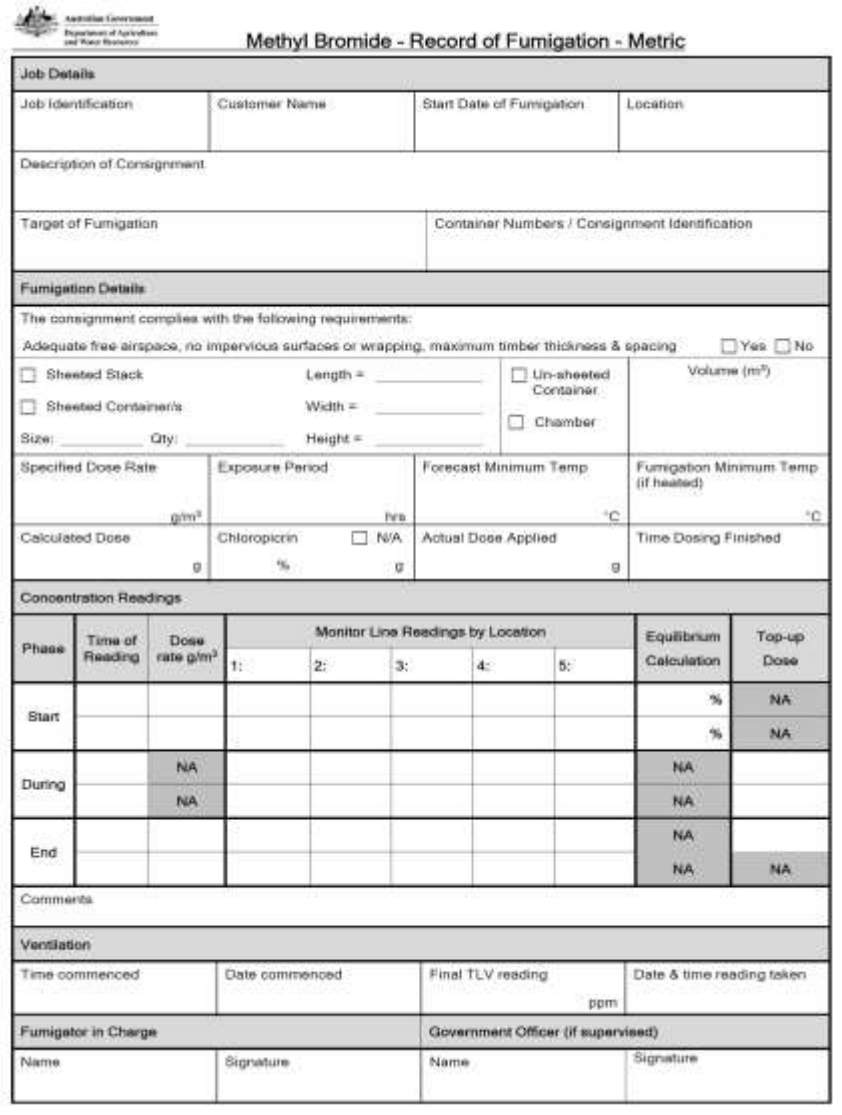
Ventilation

Time commenced	Date commenced	Final TLV Reading ppm	Date & time of final reading

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature

MB record of fumigation – imperial measurements

Records of fumigation



Methyl Bromide - Record of Fumigation - Metric

Job Details

Job Identification	Customer Name	Start Date of Fumigation	Location

Description of Consignment

Target of Fumigation	Container Numbers / Consignment Identification

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack Length = _____ ☐ Un-sheeted Container Volume (m³)

☐ Sheeted Container/s Width = _____ ☐ Chamber

Size: _____ Qty: _____ Height = _____

Specified Dose Rate	Exposure Period	Forecast Minimum Temp	Fumigation Minimum Temp (if heated)
g/m³	hrs	°C	°C

Calculated Dose	Chloropicrin ☐ N/A	Actual Dose Applied	Time Dosing Finished
g	% g	g	

Concentration Readings

Phase	Time of Reading	Dose rate g/m³	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
		NA						NA	
End								NA	
								NA	NA

Comments

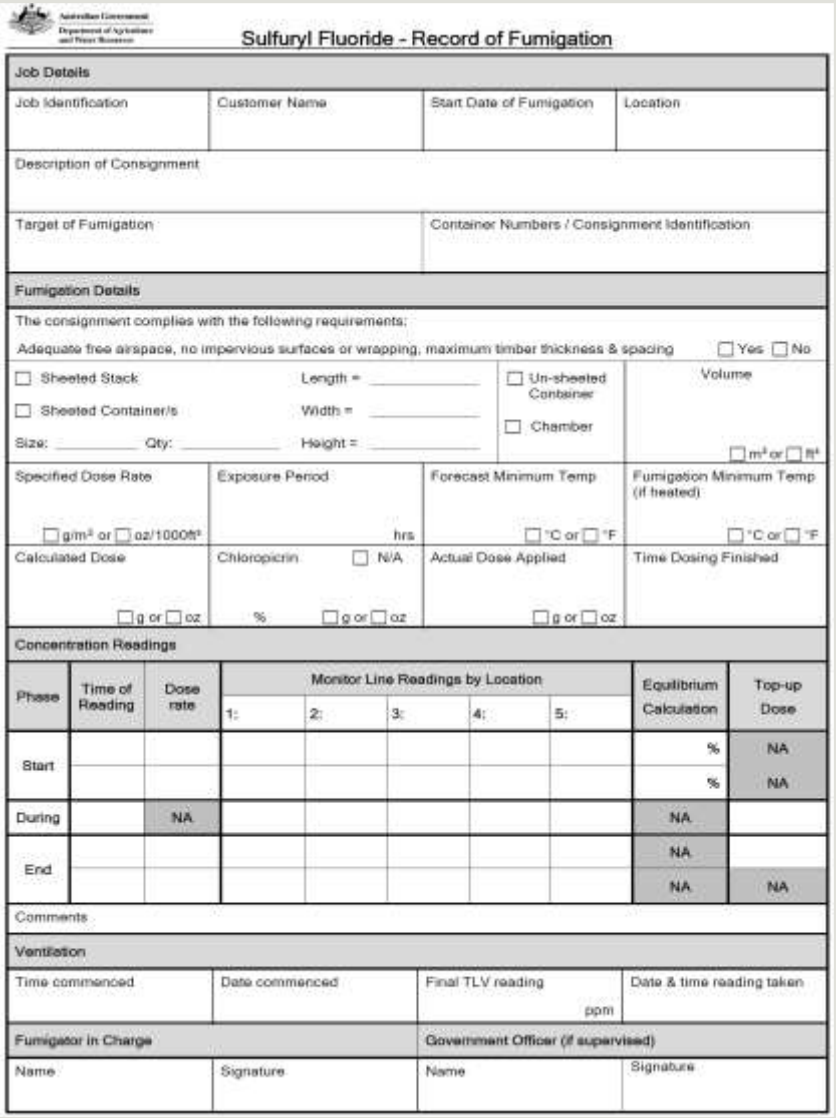
Ventilation

Time commenced	Date commenced	Final TLV reading ppm	Date & time reading taken

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature

MB record of fumigation – metric measurements

Records of fumigation



Sulfuryl Fluoride - Record of Fumigation

Job Details

Job Identification	Customer Name	Start Date of Fumigation	Location

Description of Consignment	

Target of Fumigation	Container Numbers / Consignment Identification

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack ☐ Sheeted Container/s Size: _____ Qty: _____	Length = _____ Width = _____ Height = _____	☐ Un-sheeted Container ☐ Chamber	Volume ☐ m³ or ☐ ft³

Specified Dose Rate	Exposure Period	Forecast Minimum Temp	Fumigation Minimum Temp (if heated)
☐ g/m³ or ☐ oz/1000ft³	hrs	☐ °C or ☐ °F	☐ °C or ☐ °F

Calculated Dose	Chloropicrin ☐ N/A	Actual Dose Applied	Time Dosing Finished
☐ g or ☐ oz	% ☐ g or ☐ oz	☐ g or ☐ oz	

Concentration Readings

Phase	Time of Reading	Dose rate	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
End								NA	
								NA	NA

Comments

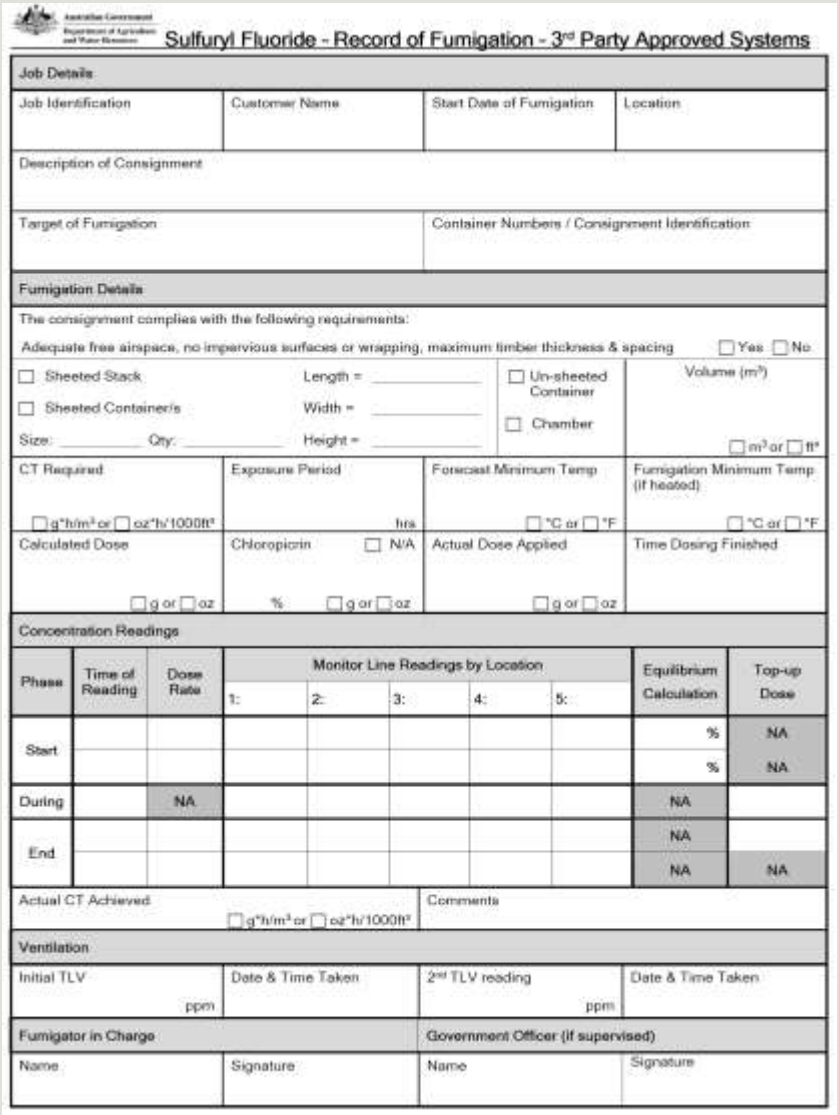
Ventilation

Time commenced	Date commenced	Final TLV reading ppm	Date & time reading taken

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature

SF record of fumigation

Records of fumigation



Sulfuryl Fluoride - Record of Fumigation - 3rd Party Approved Systems

Job Details

Job Identification	Customer Name	Start Date of Fumigation	Location

Description of Consignment

Target of Fumigation	Container Numbers / Consignment Identification

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack — Length = _____
☐ Sheeted Container/s — Width = _____
Size: _____ Qty: _____ — Height = _____
☐ Un-sheeted Container
☐ Chamber
Volume (m³) ☐ m³ or ☐ ft³

CT Required	Exposure Period	Forecast Minimum Temp	Fumigation Minimum Temp (if heated)
☐ g*h/m³ or ☐ oz*h/1000ft³	hrs	☐ °C or ☐ °F	☐ °C or ☐ °F

Calculated Dose	Chloropicrin ☐ N/A	Actual Dose Applied	Time Dosing Finished
☐ g or ☐ oz	% ☐ g or ☐ oz	☐ g or ☐ oz	

Concentration Readings

Phase	Time of Reading	Dose Rate	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
End								NA	
								NA	NA

Actual CT Achieved ☐ g*h/m³ or ☐ oz*h/1000ft³ — Comments

Ventilation

Initial TLV	Date & Time Taken	2nd TLV reading	Date & Time Taken
ppm		ppm	

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature

SF record of fumigation – third party system

SF Third party systems

SF third party systems have programs that will work out dose etc. for you

These should be used where required

However, all of the details included in our record of fumigation templates are required to be recorded

Where an SF third party system does not record any mandatory information, this information must be recorded elsewhere and included as part of the fumigators treatment records – e.g. consignment suitability statement and equilibrium calculation

Monitoring fumigant concentration

Gas retention

The gas concentration must be maintained above the minimum required concentration for the entire exposure period

The gas concentration must be monitored to ensure that a lethal dose has been achieved

Circulating the fumigant

The fumigant must be EVENLY DISTRIBUTED throughout the enclosure

- Even gas distribution is called ‘Equilibrium’
- All readings are with 15% of the lowest reading

Circulation and distribution of the fumigant is affected by

- Load configuration
- Free airspace
- Fan capacity and positioning

Only run the fans as long as necessary

Turn off the fans before taking the first readings

Frequency of monitoring

Concentration readings MUST be taken at the start and end of every fumigation

Unless the concentration levels are monitored you don’t know if the fumigation was successful

Extra readings can be done at any time

- Possible excess leakage
- Sorption
- Adverse environmental conditions

Start of the exposure period

There are 2 RULES you MUST check before the fumigation exposure period can start.

The FIRST and MOST important rule:

RULE 1 - Is the LOWEST concentration reading ABOVE the Standard Concentration?

ONLY if the first rule is TRUE do you check the second rule

RULE 2 - Is the fumigant evenly distributed throughout the enclosure?... EQUILIBRIUM

Checking for equilibrium

If all the concentration readings are above the Standard Concentration check for equilibrium

How to calculate equilibrium:

$$\frac{\text{(highest - lowest)}}{\text{lowest}} \times 100 = \%$$

The result must be 15% or less

You have achieved Start time when all concentration readings are above the Standard Concentration and equilibrium has been achieved

(It is not the time the gas was applied to the enclosure)

End of the exposure period

The elapsed time must not be less than the specified exposure period

If the lowest reading is **equal to or above** the minimum allowable end point reading Fumigation is successful and you can commence ventilation

If the lowest reading is **below** the minimum allowable end point reading a lethal dose has not been achieved and the fumigation must be redone

Even when using third party systems, these requirements are not variable

Completing the fumigation

Ventilation

Conduct a risk assessment

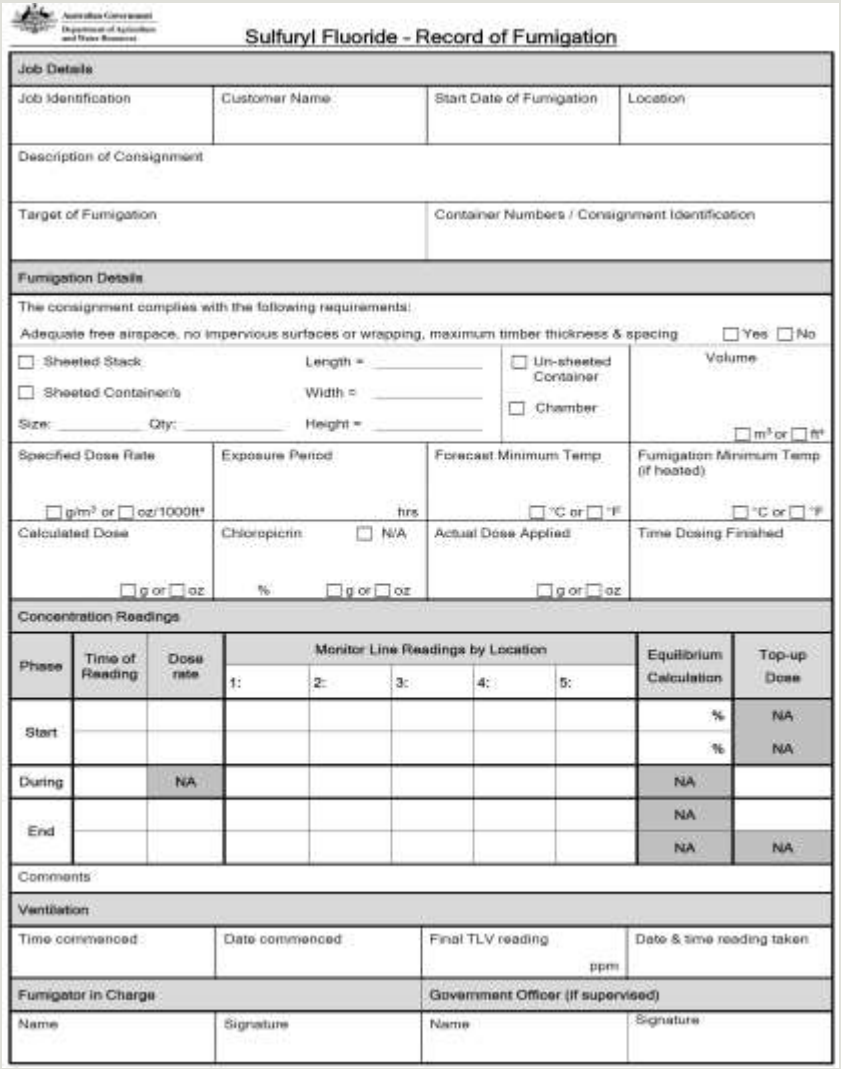
- Ensure the risk area is free of unprotected personnel
- Check down-wind area – 50 metre minimum

At the completion of ventilation the concentration must be verified below 3ppm for SF and 5ppm for MB before unprotected personnel can approach the enclosure

- May need to be checked several times
- For container, record the value for TLV and time checked
- For multiple containers each one must be verified individually

If local regulations require a lower TLV, these regulations takes precedence

Record of fumigation



Sulfuryl Fluoride - Record of Fumigation

Job Details			
Job Identification	Customer Name	Start Date of Fumigation	Location
Description of Consignment			
Target of Fumigation		Container Numbers / Consignment Identification	

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack ☐ Sheeted Container/s Size: _____ Qty: _____	Length = _____ Width = _____ Height = _____	☐ Un-sheeted Container ☐ Chamber	Volume ☐ m^3 or ☐ ft^3
Specified Dose Rate ☐ g/m^3 or ☐ oz/1000ft^3	Exposure Period hrs	Forecast Minimum Temp ☐ °C or ☐ °F	Fumigation Minimum Temp (if heated) ☐ °C or ☐ °F
Calculated Dose ☐ g or ☐ oz	Chloropicrin ☐ N/A % ☐ g or ☐ oz	Actual Dose Applied ☐ g or ☐ oz	Time Dosing Finished

Concentration Readings

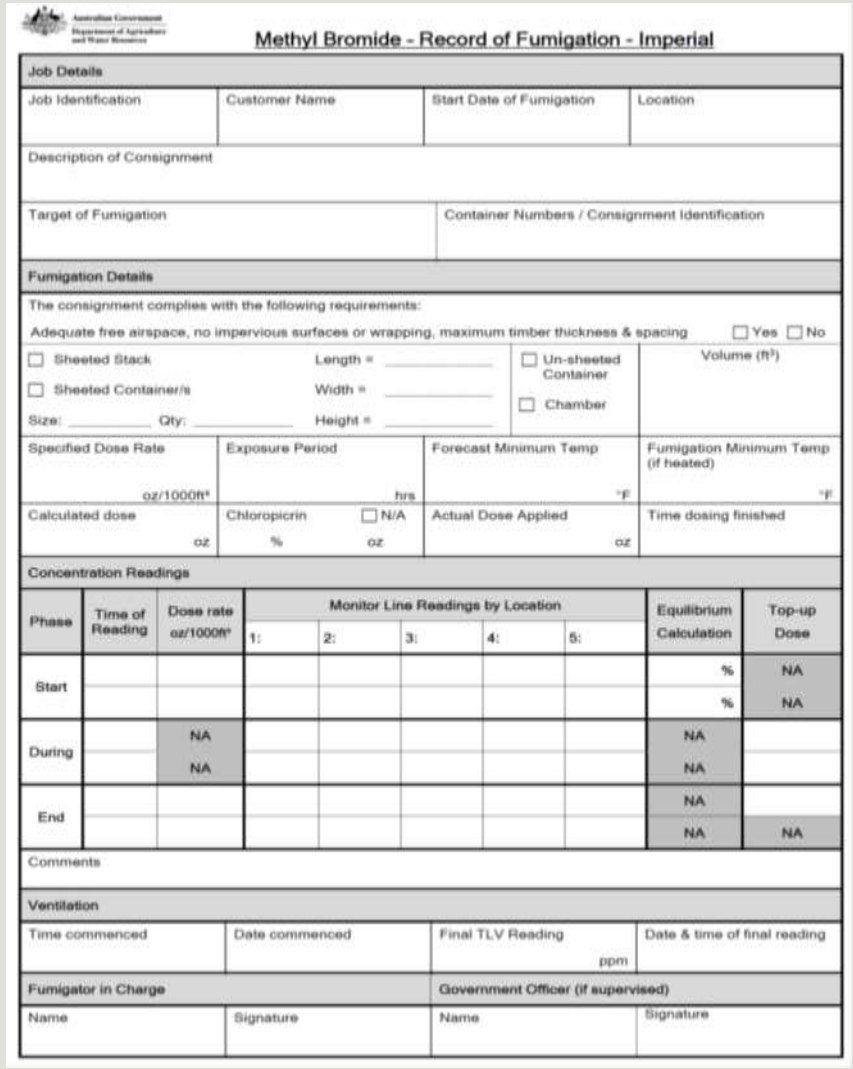
Phase	Time of Reading	Dose rate	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
End								NA	
								NA	NA

Comments

Ventilation

Time commenced	Date commenced	Final TLV reading ppm	Date & time reading taken

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature



Methyl Bromide - Record of Fumigation - Imperial

Job Details			
Job Identification	Customer Name	Start Date of Fumigation	Location
Description of Consignment			
Target of Fumigation		Container Numbers / Consignment Identification	

Fumigation Details

The consignment complies with the following requirements:

Adequate free airspace, no impervious surfaces or wrapping, maximum timber thickness & spacing ☐ Yes ☐ No

☐ Sheeted Stack ☐ Sheeted Container/s Size: _____ Qty: _____	Length = _____ Width = _____ Height = _____	☐ Un-sheeted Container ☐ Chamber	Volume (ft^3)
Specified Dose Rate oz/1000ft^3	Exposure Period hrs	Forecast Minimum Temp °F	Fumigation Minimum Temp (if heated) °F
Calculated dose oz	Chloropicrin ☐ N/A % oz	Actual Dose Applied oz	Time dosing finished

Concentration Readings

Phase	Time of Reading	Dose rate oz/1000ft^3	Monitor Line Readings by Location 1:	2:	3:	4:	5:	Equilibrium Calculation	Top-up Dose
Start								%	NA
								%	NA
During		NA						NA	
		NA						NA	
End								NA	
								NA	NA

Comments

Ventilation

Time commenced	Date commenced	Final TLV Reading ppm	Date & time of final reading

Fumigator in Charge		Government Officer (if supervised)	
Name	Signature	Name	Signature

Certification

A certificate must be issued for each fumigation conducted

Certificates must include all details required by the relevant treatment methodology

Certificate details must accurately reflect the details contained in the relevant record of fumigation

Certificates can be in any format, but we recommend using the template provided for the relevant treatment methodology on the departments website

Certificate - MB

COMPANY LETTERHEAD

(including address as it appears on the list of approved offshore BMSB treatment providers located on the Australian Department of Agriculture's website)

BROWN MARMORATED STINK BUG METHYL BROMIDE FUMIGATION CERTIFICATE

Certificate number: ☐ **AEI:** ☐

CONSIGNMENT DETAILS

Goods description: ..... Quantity: .....

Consignment link: .....

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

Name and address of exporter:	Name and address of importer:
.....	.....
.....	.....
.....	.....

TREATMENT DETAILS

Date fumigation completed ..... / ..... / ..... Time fumigation completed .....

Date ventilation commenced ..... / ..... / ..... Time ventilation commenced .....

Town/city of fumigation ..... Exposure period (hours) .....

Dose rate applied (☐ g/m³ or ☐ oz/1000ft³) ..... Minimum temperature (☐ °C or ☐ °F): .....

Lowest end-point reading (☐ g/m³ or ☐ oz/1000ft³) ..... Final TLV reading (ppm) .....

How was the fumigation conducted? ☐ Un-sheeted container ☐ Sheeted container/s ☐ Chamber ☐ Sheeted stack

Container number ..... or ☐ not applicable

Container seal number ..... or ☐ not applicable

Was all shipping packaging either removed, slashed or opened prior to treatment or applied post treatment? ☐ Yes or ☐ No

If the goods were contained in commercial packaging at the time of treatment, was the packaging applied as part of the good's manufacturing process? ☐ Yes or ☐ No

DECLARATION

☐ I declare that all information on this certificate is true, complete and accurate, and that the treatment has been conducted in accordance with the Methyl Bromide Fumigation Methodology.

ADDITIONAL DECLARATIONS

.....

..... Signature ..... Date

..... Name of Accredited Fumigator

Company stamp

Certificate - SF

COMPANY LETTERHEAD

(including address as it appears on the list of approved offshore BMSB treatment providers located on the Australian Department of Agriculture's website)

BROWN MARMORATED STINK BUG SULFURYL FLUORIDE FUMIGATION CERTIFICATE

Certificate number: **AEI:**

CONSIGNMENT DETAILS

Goods description: Quantity:

Consignment link:

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

Name and address of exporter:

Name and address of importer:

TREATMENT DETAILS

Date fumigation completed ../../.. Time fumigation completed

Date ventilation commenced ../../.. Time ventilation commenced

Town/city fumigation Exposure period (hours)

Dose rate applied (☐g/m³ or ☐oz/1000ft³) Minimum temperature (☐°C or ☐°F)

Lowest end-point reading (☐g/m³ or ☐oz/1000ft³) Final TLV reading (ppm)

How was the fumigation conducted? ☐ Un-sheeted container ☐ Sheeted container/s ☐ Chamber ☐ Sheeted stack

Container number or ☐ not applicable

Container number or ☐ not applicable

Was all shipping packaging either removed, slashed or opened prior to treatment or applied post treatment? Yes ☐ No ☐

If the goods were contained in commercial packaging at the time of treatment, was the packaging applied as part of the good's manufacturing process? Yes ☐ No ☐

DECLARATION

☐ I declare that all information on this certificate is true, complete and accurate, and that the treatment has been conducted in accordance with the Sulfuryl Fluoride Fumigation Methodology.

ADDITIONAL DECLARATIONS

Signature Date

Name of Accredited Fumigator

Company stamp

COMPANY LETTERHEAD

(including address as it appears on the list of approved offshore BMSB treatment providers located on the Australian Department of Agriculture's website)

BROWN MARMORATED STINK BUG SULFURYL FLUORIDE FUMIGATION CERTIFICATE – 3rd Party Approved Systems

Certificate number: **AEI:**

CONSIGNMENT DETAILS

Goods description: Quantity:

Consignment link:

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

Name and address of exporter:

Name and address of importer:

TREATMENT DETAILS

Date fumigation completed ../../.. Time fumigation completed

Date ventilation commenced ../../.. Time ventilation commenced

Town/city fumigation Exposure period (hours)

CT Achieved (☐g-h/m³ or ☐oz-h/1000ft³) Minimum temperature (☐°C or ☐°F)

Lowest end-point reading (☐g/m³ or ☐oz/1000ft³) Final TLV reading (ppm)

How was the fumigation conducted? ☐ Un-sheeted container ☐ Sheeted container/s ☐ Chamber ☐ Sheeted stack

Container number or ☐ not applicable

Container seal number or ☐ not applicable

Was all shipping packaging either removed, slashed or opened prior to treatment or applied post treatment? Yes ☐ No ☐

If the goods were contained in commercial packaging at the time of treatment, was the packaging applied as part of the good's manufacturing process? Yes ☐ No ☐

DECLARATION

☐ I declare that all information on this certificate is true, complete and accurate, and that the treatment has been conducted in accordance with the Sulfuryl Fluoride Fumigation Methodology.

ADDITIONAL DECLARATIONS

Signature Date

Name of Accredited Fumigator

Company stamp

Heat Treatment Principles

Heat Treatment

Biosecurity heat treatments are conducted to kill pests that may be in the goods/consignments

To ensure effective heat treatments, the entire consignment must be raised to the required temperature for the required duration

The key parameters of biosecurity heat treatments must be verified and documented to confirm that the heat treatment was successful

Consignment suitability

Target of the treatment

BMSB is a hitchhiker pest, therefore the target of BMSB heat treatments is both the commodity and packing present at the time of treatment

For BMSB treatments:

- Commercial packing applied during manufacture **is not** required to be opened/slashed
- Shipping packing **is** required to be opened, slashed or otherwise adjusted to allow the locations that are hardest to heat to reach the required temperature

Exposure to the heat

BMSB can access extremely hard to reach locations within the goods/consignments

Therefore **all points within the goods must** reach the required temperature for the required duration

The heat must be able to circulate freely throughout the enclosure to achieve the required temperature in all locations as efficiently as possible

There must be adequate separation between individual items / pallets

Setting up the enclosure

Temperature sensors

- There must be a minimum of three (3) per enclosure placed in the goods, in the hardest to heat locations

AND

- A minimum of two (2) per enclosure in the free airspace, out of the direct airflow from the heat source

- **Five (5) in total per enclosure**

- Recommend using more when treating new commodity types and very large enclosures

Setting up the enclosure

Temperature sensor locations

The three (3) in the goods

- Separated from each other
- Placed deep within the goods, not in the free air space
- In the locations that are the hardest to heat

The two (2) in the free airspace

- Away from the direct airflow from the heat source
- One as close to the back of the enclosure as possible
- One at the front, on the opposite side to the heat source.

Setting up the enclosure

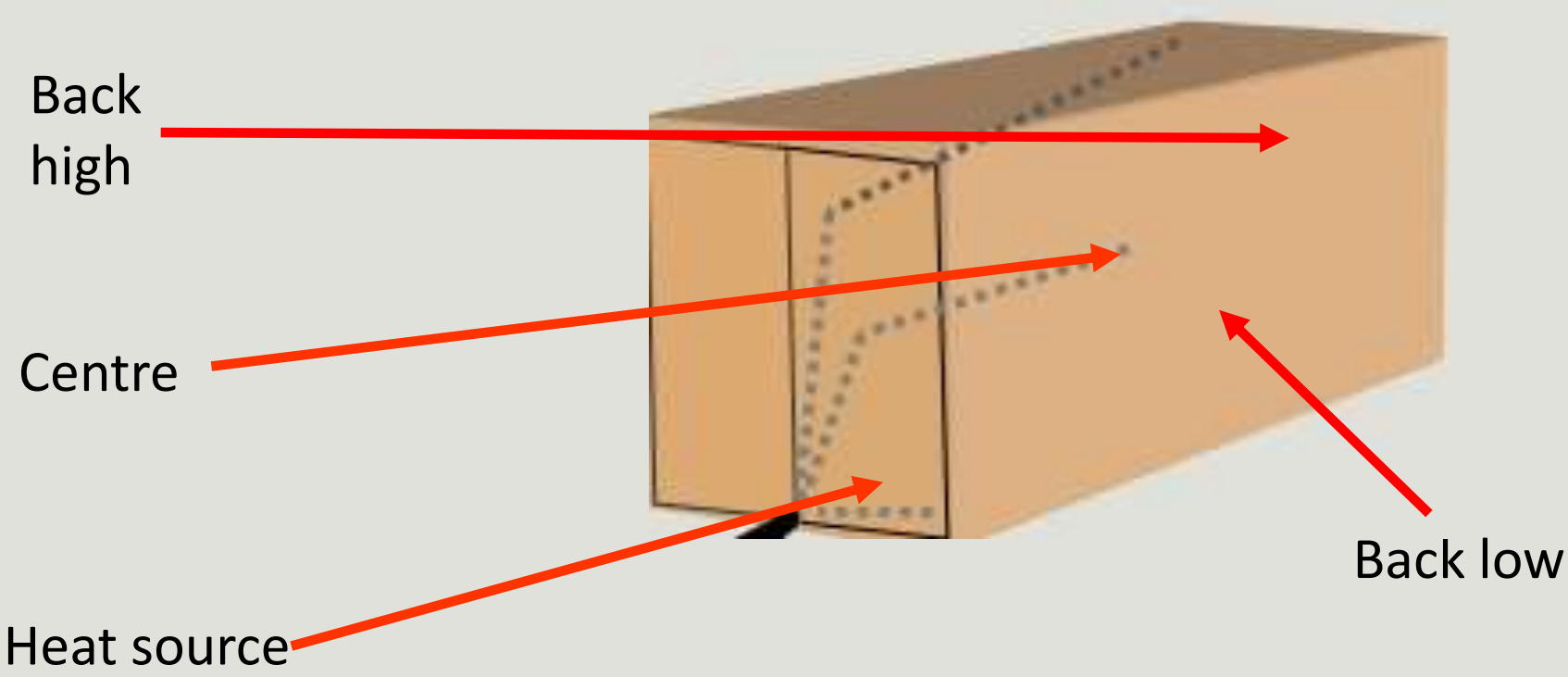
When the temperature sensor placement requirements **can not** be met the consignment must be reconfigured so the temperature sensor placement requirements met

Options include:

- Treat before loading into container or in batches
- Consider alternative treatment type (SF or MB?)

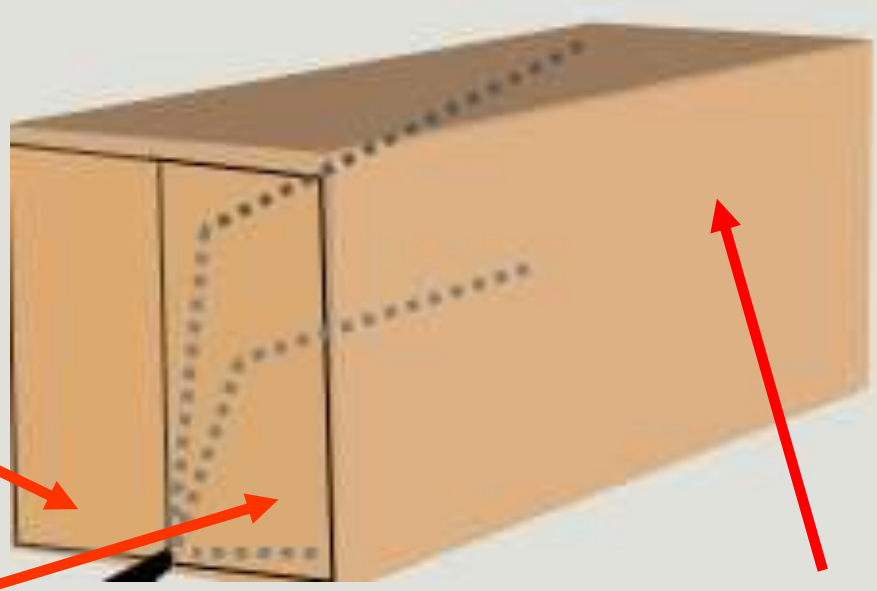
Goods temperature sensor placement

All enclosures must have a minimum of three temperature sensors, placed deep within the goods, out of the air flow



Air temperature sensor placement

All enclosures must have a minimum of two temperature sensors, placed within the free airspace, out of the air flow



Sensor placement examples

Scenario	Important information
Heat source is located at one end of the container (e.g. at the door of the container)	Sensors must be placed in the middle and far end of the container, well away from the heat source. They should be placed within the hardest to heat location/centre of the goods being treated.
Heat source is located at both ends of the container	Sensors must be placed in the middle of the container, well away from both heat sources. They should be placed within the hardest to heat location/centre of the goods being treated.
Container is full of many tonnes of tightly packaged goods	It may take several hours (or longer) for the air in the coldest part of the goods to reach the target temperature. If the temperature probes reach the target temperature quickly (e.g. less than 30-45 minutes), it is likely that they have not be places in the correct location.
Pallet of bricks / cardboard boxes	Bricks may take several hours/days for the air in the coldest part of the goods to reach the target temperature. Sensors must to be placed within the centre of the goods, such as in the middle of the pallet of bricks or in between cardboard boxes. The placement of the sensors must not create additional access for heat in that specific area relative to the rest of the goods being treated. For example, when a temperature sensor is placed in a box, the space created by the sensor should be sealed so the air flow into the box is representative of the other boxes in the load.

Sensor placement examples

Cars and large break-bulk consignments such as farm and mining equipment

- Deep within the engine bay
- Under the driver's seat, under carpets
- Within the cab compartment of farm/mining equipment
- In the boot/trunk, under spare wheel
- Within small enclosed spaces under the bonnet of vehicles
- Large break-bulk goods will take a significant amount of time to reach the required temperature. With multiple hard to heat locations, an increase in the number of temperature sensors used is recommended
- Open all windows and compartments (glove box, centre consoles etc.)

Heating the entire consignment

Exposure to the fumigant

Exposure to the fumigant

Exposure to the fumigant

Exposure to the fumigant

Exposure to the fumigant

Exposure to the fumigant

Heating the entire consignment

Heating the entire consignment

Temperature data logging

Temperature sensors must be connected to data loggers that can be monitored from outside the enclosure

Data loggers must record temperature for each sensor at least every minute

Temperature must be recorded from the time the heat source is turned on and temperature records (graphs) must include the heat up time

Heat Treatment

Treatment duration commences when all temperature sensors are above the required temperature, plus the accuracy range of the sensors.

e.g. 56 °C plus 0.2 °C = 56.2 °C

The treatment is complete when all temperature sensors simultaneously maintain a temperature above the minimum for the treatment duration

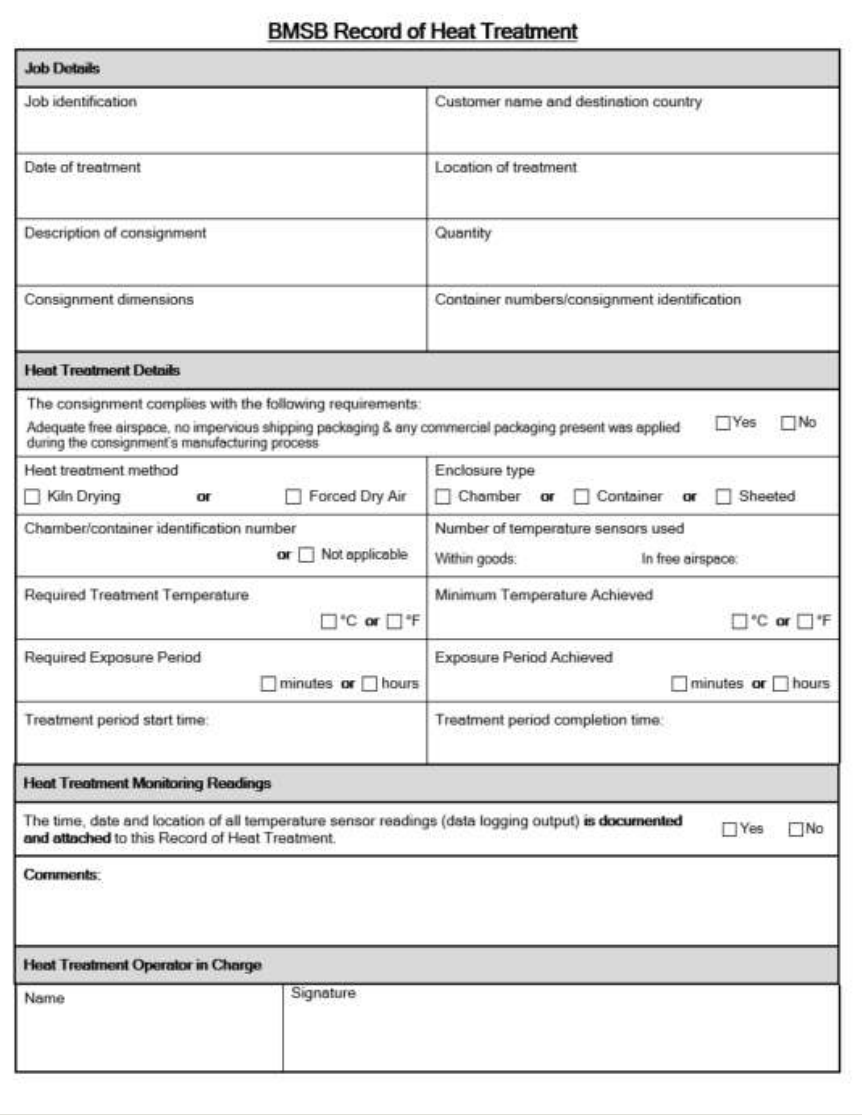
Record of treatment

You need to measure and record information about each heat treatment

- Job/consignment details
- Treatment requirements and specifications
- Temperature data recordings from the time heat is applied to the completion of the treatment duration, including the times taken – this can be maintained as a separate, but attached, document to the record of heat treatment
- Identification of treatment operator responsible

The Record of Heat Treatment must be completed on-site

Record of heat treatment



BMSB Record of Heat Treatment

Job Details	
Job identification	Customer name and destination country
Date of treatment	Location of treatment
Description of consignment	Quantity
Consignment dimensions	Container numbers/consignment identification
Heat Treatment Details	
The consignment complies with the following requirements: Adequate free airspace, no impervious shipping packaging & any commercial packaging present was applied during the consignment's manufacturing process ☐Yes ☐No	
Heat treatment method ☐ Kiln Drying **or** ☐ Forced Dry Air	Enclosure type ☐ Chamber **or** ☐ Container **or** ☐ Sheeted
Chamber/container identification number **or** ☐ Not applicable	Number of temperature sensors used Within goods: In free airspace:
Required Treatment Temperature ☐°C **or** ☐°F	Minimum Temperature Achieved ☐°C **or** ☐°F
Required Exposure Period ☐ minutes **or** ☐ hours	Exposure Period Achieved ☐ minutes **or** ☐ hours
Treatment period start time:	Treatment period completion time:
Heat Treatment Monitoring Readings	
The time, date and location of all temperature sensor readings (data logging output) **is documented and attached** to this Record of Heat Treatment. ☐Yes ☐No	
Comments:	
Heat Treatment Operator in Charge	
Name	Signature

Temperature sensor graphs must also be maintained with each heat treatment record

Certification

A certificate must be issued for each heat treatment conducted

Certificates must include all details required by the heat treatment methodology

Certificate details must accurately reflect the details contained in the relevant record of heat treatment

Certificate template? Can be in any format, but we recommend using the template provided in the heat treatment methodology

Certification

COMPANY LETTERHEAD

(Including address as it appears on the list of approved offshore BMSB treatment providers located on the Australian Department of Agriculture's website)

BROWN MARMORATED STINK BUG HEAT TREATMENT CERTIFICATE

Certificate number: _____ **AEI:** _____

CONSIGNMENT DETAILS

Goods description: ..... Quantity: .....

Consignment link: .....

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

Name and address of exporter:	Name and address of importer:
.....	.....
.....	.....
.....	.....

TREATMENT DETAILS

Date heat treatment completed ..... / ..... / ..... Time heat treatment completed .....

Town or city of treatment ..... Exposure period (☐ minutes or ☐ hrs) .....

Required temperature (☐ °C) ..... Temperature maintained (☐ °C or ☐ °F) .....

Heat treatment method: ☐ Forced dry air ☐ Kiln drying

Container number ..... or ☐ not applicable

Container seal number ..... or ☐ not applicable

Was all shipping packaging either removed, slashed or opened prior to treatment or applied post treatment? ☐ Yes or ☐ No

If the goods were contained in commercial packaging at the time of treatment, was the packaging applied as part of the good's manufacturing process? ☐ Yes or ☐ No

DECLARATION

☐ I declare that all information on this certificate is true, complete and accurate, and that the treatment has been conducted in accordance with the Heat Treatment Methodology.

ADDITIONAL DECLARATIONS

.....

.....

....

Signature Date

....

Name of Accredited Treatment Provider Accreditation Number

Company stamp