ProFume[®] and Vikane[®] Fumigant Stewardship Program & Quarantine Treatments for Brown Marmorated Stink Bug (Halyomorpha halys)

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History

- **1961** Sulfuryl fluoride first marketed in United States as Vikane[®] fumigant by Dow Chemical for control of drywood termites and other structure infesting pests.
- **1992** First use of Vikane in Europe (Germany) to control wood-boring beetles in historic churches.
- Today More than three million structures, including museums, cathedrals, historical landmarks, rare book libraries, and scientific and medical research laboratories, have been fumigated with Vikane to eradicate pests.





History

- 1995 At the request of progressive food industries, Dow AgroSciences began investigation of sulfuryl fluoride as a methyl bromide alternative for post-harvest insect control.
 - Dow AgroSciences formed partnerships with leading stored product researchers, fumigators, distributors and food industries around the world to develop ProFume[®] fumigant.
- **2003** First registration of ProFume (Switzerland).
- **Today** ProFume is used to treat a **wide range of commodities** including cereal grains, dried fruit and tree nuts, herbs and spices, processed foods, dried vegetables, etc.



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Vikane

ProFume

Quarantine Applications



- Although not originally developed for use as a quarantine treatment, both Vikane[®] and ProFume[®] fumigants are used to fumigate various goods (vehicles, machinery, tile, wine barrels, wood products, etc.) exported to Australia and New Zealand for control of Brown Marmorated Stink Bug (BMSB) (*Halyomorpha halys*).
 - ProFume and Vikane are also used to treat logs exported to China.
 - ISPM treatment schedules for sulfuryl fluoride are available for wood packaging material and logs.
 - Sulfuryl fluoride is being considered for additional quarantine applications.



What's up with Brown Marmorated Stink Bugs (BMSB)?



Brown Marmorated Stink Bugs



BMSB is a quarantine pest (hitchhiker) for AUS and NZ. There are 3 approved quarantine treatment options, one of which is sulfuryl fluoride.

- Treatment is required during a specific timeframe that relates to the biology of the insect. Adults seek sheltered areas to overwinter (treatment is required Sept. 1 – April 30). During this timeframe, the insects are not actively feeding, and no oviposition is occurring.
- Shipping containers, vehicles, equipment being exported can harbor large numbers of BMSB during the Fall through Spring.



Number of BMSB Incidents and Status By Season (AUS)



Graph from: March 2019 Connecting biological and trade data to managing the risk from *Halyomorpha halys*, brown marmorated stink bug (BMSB). Presentation by Brian Garms to US Fumigators (Australian Government Department of Agriculture and Water Resources).



Vikane

ProFume

MIGAN

BMSB Quarantine Fumigations

In 2019, increased interceptions of BMSB in imported cargo raised concerns for AUS and NZ regulatory personnel.

As a result, Douglas Products and AUS Regulatory/Biosecurity personnel partnered to determine cause(s) of increase and then, identify and implement solutions. Douglas Products took the following steps:

- Arranged for AUS/NZ regulatory personnel to view port fumigations and meet with fumigators in both EU and US.
- Discussed with AUS Biosecurity possible solutions to ensure SF is used appropriately and treatments are being made as required.
- Incorporated training for BMSB applications into annual stewardship program.
- Developed specific training for SF container and automobile fumigations.



Why A Product Stewardship Program?



- Sulfuryl fluoride is a colorless, odorless gas at concentrations used in fumigations. It is not irritating to skin or eyes.
 - Users must be licensed for fumigation and meet established requirements of the Douglas Products stewardship program to purchase and use Vikane[®] and ProFume[®].
- Sulfuryl fluoride has been successfully used to control pests for over 60 years and product stewardship programs and activities associated with Vikane and ProFume have evolved over this time.
 - Product stewardship efforts have been an integral part of maintaining continued effective use of these fumigants.



Product Stewardship Program

 The Program is not static – it is updated continuously to meet industry needs.



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Product Stewardship Program

- The Program is not static it is updated continuously to meet industry needs.
- The Program is tailored to meet needs of a specific country, region or product use pattern.



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Product Stewardship Program



- The Program is not static it is updated continuously to meet industry needs.
- The Program is tailored to meet needs of a specific country, region or product.
- The Program compliments regulatory oversight does not replace it.





Stewardship Program Objectives

- Focus on safety
- Prevent human injury fumigator, fumigation workers, customers, and the public
- Maintain fumigation with sulfuryl fluoride as an effective way to eliminate target pests
- Help fumigators address customer and consumer questions
- Minimize, mitigate and manage risk

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Stewardship Program Components



- 1. Written stewardship policy for distributors and fumigators
- 2. Initial and annual stewardship training
- 3. Additional training programs
- 4. Quality Assurance Reviews/On-Site Observation
- 5. Stewardship compliance policies
- 6. Product integrity sulfuryl fluoride and cylinder fleet management
- 7. Cylinder tracking
- 8. Emergency response
- 9. Customer Information Group
- 10. Technical support
- 11. Fumiguide[™] System





Distributor and Fumigator Stewardship Policy

To promote product stewardship and educate fumigators on the continued use of Vikane[®] and ProFume[®] fumigants in accordance with label directions as well as requirements from Douglas Products.

Distributor and Fumigator Stewardship Policy

Policies may vary slightly by country, but all policies require the following:

- To purchase Vikane[®] or ProFume[®], distributors and fumigators must sign and follow a written stewardship policy for each fumigant.
- Failure to comply with requirements stated in the policy may result in the loss of the ability to purchase and use Vikane or ProFume fumigants.





Stewardship Program Components Addressing BMSB



- 1. Written stewardship policy for distributors and fumigators
- 2. Initial training (New users of Vikane® and/or ProFume®)
- 3. Annual Stewardship Training (Existing users of Vikane and ProFume)
- 4. Additional training programs
- 5. Quality Assurance Reviews/On-Site Observation
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Annual Stewardship Training

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- Stewardship policy
- Use of safety equipment and procedures
- Cylinder handling
- Emergency response and risk mitigation
- Best Practices
- Any new developments policies, procedures, labeling changes, equipment, federal, state and local regulations

Annual Stewardship Training

The 2-hour training course is conducted by live instruction and includes:

- Hand-outs
- Audience participation activities
- Final quiz

Training program qualifies for Continuing Education Units (CEUs) if needed to maintain licensing.

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Annual Stewardship Training



Development of annual stewardship training for Vikane[®] and ProFume[®] fumigants:

- Program content developed by Douglas Products technical and commercial personnel responsible for Vikane and ProFume.
 - Input and information from fumigators, distributors, regulators, industry associations and other experts.
- Presentations are developed by personnel with expertise in adult education programs.
- Program is reviewed with Douglas Products' representatives tasked with delivery of the training to ensure understanding.



Annual Stewardship Training



Two main sections based on material covered:

- Annually covered to meet label and stewardship policy requirements: Stewardship policy, use of safety equipment and procedures, cylinder handling, emergency response and risk mitigation, Best Practices, and new developments.
- Variable content to meet specific geographical or regional needs. These topics are based on feedback from users, DP sales personnel, DP technical personnel and other stakeholders.



Annual Stewardship Training: Variable Content

- Topics vary based on needs:
 - Preparation for residential fumigations.
 - Proper selection of introduction equipment.
 - Best practices for monitoring.
 - Dealing with connected structures.
 - BMSB quarantine treatments.





- Review AUS requirements for fumigator registration.
- Remind fumigators to confirm treatment schedules and procedures.
- Review additional documentation.
- Review fumigation requirements for monitoring.
- Review any additional or new requirements associated with BMSB treatments.
- Review use of Fumiguide[™] with BMSB treatments.



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Sulfuryl fluoride (ProFume[®] gas fumigant) treatment schedule for BMSB

Temperature	Exposure Period	Minimum Initial Concentration	Minimum Ending Concentration
10° C or above	Minimum of 12 hours but less than 24 hours	24 g/m ³	12 g/m ³
10° C or above	24 hours or longer	24 g/m ³	8 g/m ³

- Dose increases to compensate for temperatures less than 10°C is NOT permitted.
- Topping up with additional fumigant at the end of treatment is NOT permitted.
- If the concentration of fumigant falls below the minimum end point reading at any point during the treatment, the treatment has failed.

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Sulfuryl fluoride (ProFume® gas fumigant) treatment schedule for BMSB

Temperature	Exposure Period	Required Dosage (g-h/m ³)	Minimum Ending Concentration
10° C or above	Minimum of 12 hours but less than 24 hours	200	12 g/m ³
10° C or above	24 hours or longer	200	8 g/m ³

- Douglas Products ProFume Fumiguide[®] program is an "approved third party system."
- The Fumiguide can be used to record monitoring readings and calculate total accumulated CT.



PRODUCTS





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PRODUCTS



Quarantine Fumigations – Brown Marmorated Stink Bug (BMSB)



Regarding documentation, two documents are required for each fumigation.

 Fill out the Record of Fumigation as the fumigation is being conducted! The form is provided on the web site.

Quarantine Fumigations -Brown Marmorated Stink Bug (BMSB)

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2. Fumigation Certificate (form provided on the web site).

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PRODUCTS



Quarantine Fumigations – Brown Marmorated Stink Bug (BMSB)

Australian Government

How to complete the Australian Department of Agriculture, Water and the Environment Approved Sulfuryl Fluoride Pumigation Certificate

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Certificate must be on the treatment provider's letterhead

The letterfund must include the address of the famigation to statemi providey that matches the address published on the approved 3st. Where a company has more than our branch, the address on the letterhead must match that on the approved bit for the fework that insert the certificate.

Certificate Number

department's website

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AU Each-ortificate root include the snape AE number they on assigned by the department, AE compares hered as acceptable on the approval last are inseed as AE1 susher. Each AE1 sucher includes a drow dearcher country code_A base digit memory identification number, and a base linker measure ode.

Target Description

Provide a short summary of the target of the funigation. For enargie, "agricultural machinery'. Comignment Link

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settlicze. Consignment Details

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The contificate must also include the quantity, the country of arigin, the intended part of loading and country of doctrustion, as well as the name and addresses of the exporter and importer.

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- Detailed description on how to fill-out the fumigation certificate is provided on the web site.
- Common question: "Final TLV reading" on fumigation certificate is the final clearance reading.
 - This should be 1 ppm or less based on requirements of the U.S. labeling for ProFume[®] gas fumigant.





Quarantine Fumigations – Brown Marmorated Stink Bug (BMSB)

- U.S. Fumigators must register each year with Australian authorities to conduct the mandatory treatments of target high risk goods exported to Australia.
- Requirements for registering are at the web site (updated June 2020):

http://www.agriculture.gov.au/import/befor e/brown-marmorated-stink-bugs/offshorebmsb-treatment-providers-scheme

 Summary of key changes to the Offshore BMSB Treatment Providers Scheme also found on this site.



Review requirements for registering for fumigation companies which had previously registered and for companies who have never registered.

Make sure participants understand due dates.

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Fumigations de <u>quarantaine</u> – Punaise diabolique -Brown Marmorated Stink Bug (BMSB))

- Les normes minimales décrites dans la « méthode de fumigation du fluorure de <u>sulfuryl</u> » (25 pages) comprennent :
 - Préparation
 - · Calcul de la dose
 - · Application initiale et recharge vers le haut
 - Surveillance
 - Aération

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- Documentation
- Télécharger le traitement au fluorure de sulfuryl
- · documents du site Web :
- <u>http://www.agriculture.gov.au/import/arrival/treatments/treatments-fumigants#sulfuryl-fluoride-fumigation</u>

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Sulfuryl fluoride fumigation

methodology

This information is included in Annual Stewardship Training Programs in countries where this application is mandated.



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Additional Training Programs

- Content is targeted to meet participant specific needs.
- Allows participants to focus on topic.
- Sessions include both classroom and hands-on demonstrations.
- May run for 1-2 hours to 1-2 days depending on topics and participant needs.



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Additional Training Programs

University Hosted Pest Management Workshops/Conferences:

- Florida A&M University: PCO Workshop
- University of Florida: Southeast Pest Management Conference
- Kansas State University: Pest Management Conference
- University of California Riverside: Pest Management Conference
- Purdue University: Pest Management Conference

Pest Control Association Meetings and Workshops:

- National Pest Management Association
- Florida Pest Management Association, Certified Pest Control Operators of Florida
- Pest Control Operators of California
- Hawaii Pest Control Association
- Georgia Pest Control Association
- North Carolina Pest Control Association

Specific Education Programs for Fumigation Companies:

• More than 25 programs conducted on dosage calculation, graphing, general preparation, aeration procedures, clearance testing, fumigation for bed bug control, special fumigations (e.g., vehicles, container fumigations for BMSB quarantine treatments).

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BMSB Quarantine Fumigations

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Additional Training Programs: Vehicle Fumigations for BMSB



Review critical components for an effective fumigation including preparation, monitoring, and aeration.

Safety reminders.

Automobiles & Equipment

Vehicle preparation

- Vehicle should be clean and reasonably dry
- At least one window, if present and operational, should be opened a minimum of 3 inches



 Large compartments, such as trunks and passenger compartments, must be inspected prior to fumigation to ensure they have been vacated by all people, domestic animals and pets



Additional Training Programs: Vehicle Fumigations for BMSB

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Vehicles, Equipment, Nachinery and Parts for

Control of the Brown Marmorated Stick Bug



BEST PRACTICES FOR USE OF PROFUME® GAS FUMIGANT FOR FUMIGATION

OF STATIONARY VEHICLES AND EQUIPMENT

FOR CONTROL OF THE BROWN MARMORATED STINK B

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These are provided by Douglas Products upon request to our customers at no cost.

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Additional Training Programs: Container Fumigations for BMSB

- Best Practices for Sealing using Tape and Seal or Tarp methods.
- Best Practices for aeration.
- Review monitoring line placement requirements.

Container Inspection & Sealing

Sealing methods may include:

- Vinyl coated tarps or polyethylene sheeting a minimum of 4-6 ml
- Overlapping sand or water snakes
- Sand, dirt, crushed ground/asphalt
- · Taping tarps to floor combined with spray adhesive
- · Wetting any soil base or perimeter

Container Inspection & Sealing

Doors

- Rubber seals may be damaged and require taping during exposure
- If the doors cannot be closed, use of tarps or polyethylene sheeting and tape may be necessary

Container Inspection & Sealing

- Check for damaged areas, pay special attention to rust, holes or exhaust vents which may require additional sealing for adequate fumigant confinement
- Sealants may include: Foam or rubber seals, tape, spray foam, silicone caulking

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Development of BMSB Training



- All content is reviewed annually and updated to reflect most recent information available.
- Annual stewardship content is developed in the summer months for release in the following year.
 - We are working on the 2022 annual training now.
- Open communication between Stakeholders such as AUS Regulatory/ Biosecurity Personnel and Douglas Products allows us to provide ProFume[®] and Vikane[®] users the most current information to address concerns and ensure the product is used appropriately and remains effective.



Summary



- The ongoing partnership between AUS Regulatory/Biosecurity personnel has been critical to the identification and implementation of successful solutions to addressing issues and concerns associated with quarantine treatments for BMSB control.
- The stewardship annual training included in the larger stewardship program provides an opportunity to address current needs associated with a geography, region or use pattern.
- Additional training programs offered by Douglas Products to specific fumigation companies allows for delivery and reinforcement of targeted information helping to ensure compliance with requirements associated with sulfuryl fluoride use in BMSB quarantine applications.

