

VIKANE®

Getting the Most out of a Fumigation



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When a fumigation does not successfully control the target pest, the simple reason for the failure is that the target lethal dosage was not accumulated at the pest site during the fumigation. The tables on the following pages summarize all the factors affecting accumulation of the lethal dosage for a target pest, and how to prevent errors to ensure a successful fumigation.



Factor	Effect on Accumulating Dosage	Errors	How to Prevent Errors
Target Pest and Life Stage	Dosage (oz-hr) is dependent on the target pest and its life stage. Many nonsocial insects, such as dermestid beetles and cockroaches, require a higher dosage of Vikane® fumigant than that needed to kill drywood termites. The egg stage of insects may require 4- to 54-fold the dosage of Vikane needed to kill adults. Dosages are expressed as multiples of the drywood termite dosage. The maximum label dosage for Vikane is 10X the drywood termite dosage.	<ol style="list-style-type: none"> 1. Misidentify target pest - Can result in selecting inadequate dosage with Vikane. 2. Fumigator assumes that dosage factor provided for target pest kills all life stages of the pest. The dosage factors for cockroaches (except German cockroaches) and Carpet Beetles does not control their egg stages, which require more than the maximum label rate of Vikane (10X the drywood termite dosage) for control. 	<ol style="list-style-type: none"> 1. Have State Extension Service or Entomologist confirm identification of an insect or arthropod you do not recognize. 2. If control of the egg stage is important for a cockroach, other than German cockroach, or carpet beetle infestation, conduct a second fumigation about 1 month following the first fumigation to kill nymphs/ larvae hatching from the surviving eggs.
Temperature	The dosage for a target insect or other arthropods (spiders, ticks) is dependent on the temperature, which affects their rate of respiration. Increasing the temperature increases their respiration rate and exposure to the fumigant, and thus decreases the dosage. Conversely, decreasing the temperature increases the dosage. Vikane is not applied when the temperature at the site of an insect pest is below 40°F (this does not apply to fumigations for rodent control).	Temperature is not measured in an area which indicates the temperature of coldest site which could harbor the pest. The most common error is to use ambient temperature, rather than slab or soil temperature, to determine the dosage for wood-destroying insects.	<p>For slab foundations, measure slab temperature indoors using a surface thermometer or IR thermometer.</p> <p>For crawlspace foundations, measure soil temperature 2-3 inches below the soil surface on a shaded side of the foundation using a probe thermometer or IR thermometer.</p>

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Exposure Period	Dosage (oz-hr) = concentration (oz/ MCF) x time (hr). If the time (exposure period) is reduced, then the amount of fumigant applied (concentration) must be increased. The Fumiguide™ calculator and app calculate dosages for exposure periods from 2-72 hr. Fumigation periods of less than 4 hr are not recommended for many insect and arthropod pests.	<ol style="list-style-type: none"> 1. Fumigation tarps are taken down prematurely due to route scheduling problems or lack of tenting materials for new jobs. 2. The Fumiguide B slide rule, designed for 20-24 hr. fumigation exposure periods, is used to determine dosage for fumigations less than 20 hr. in duration. During peak fumigation season in southern FL and CA, the exposure period of many fumigations is 16-18 hr. 3. Fumigator does not deduct one hour from fumigation period to determine the actual exposure period. 	<ol style="list-style-type: none"> 1. Schedule daily fumigations so sufficient materials and manpower are available for new jobs without taking down existing fumigations prematurely. Consider having separate “up” crew and “down” crew. The down crew could start at 10 a.m. and keep re-supplying the up crew. 2. Use the Fumiguide calculator or app for easy determination of dosage for fumigations less than 20 hr in duration. 3. When using the Fumiguide System, the exposure period begins one hour after introduction of Vikane® fumigant ends. The hour provides time for the fumigant to reach equilibrium (distribute within voids and insect galleries) throughout the fumigated space.
Tarp Condition	One of five factors the Fumiguide uses to estimate time to lose half the fumigant (HLT) from the fumigated space. Tarps are rated poor, fair, medium, good and excellent. The better the tarp condition and rating, the better the confinement of Vikane, the higher the HLT, and less Vikane is required to accumulate the target dosage.	<ol style="list-style-type: none"> 1. Fumigator overrates the quality of the tarps. 2. Tarps contain holes which are not mended prior to the fumigation. 3. Tarps can no longer confine fumigant; they have vinyl abraded off. 	<ol style="list-style-type: none"> 1. Use a Fumiscope or similar device to monitor several fumigations to measure actual HLT to determine appropriate rating for tarp condition. 2. Use tarp tape, appropriate glue and vinyl patches (not masking tape) or sewing to mend torn tarps. Use corner pads to avoid tearing tarps on eaves. 3. Retire tarps which you can see daylight through when inspected from inside a tarped structure.

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Seal Condition	<p>One of five factors the Fumiguide™ uses to estimate HLT. Seal condition refers to tent seams and ground seal. Seal is rated poor, fair, medium, good and excellent. The better the seal condition and rating, the better the confinement of Vikane® fumigant, the higher the HLT, and less Vikane is required to accumulate the target dosage. Poor ground seal is the most common reason for fumigant loss.</p>	<ol style="list-style-type: none"> Excessive leakage due to mulch, gravel, leaf litter and other debris under tent on ground seal. Gaps exist between the tarps and the ground seal, particularly over uneven surfaces. Snakes are incompletely filled and do not properly secure tarps to make a tight ground seal. Snakes are not properly overlapped to create a continuous ground seal. Sand-filled snakes can get hard or clumpy when wet and may not mold to the terrain. Water snakes can abrade with usage, causing a gradual water leakage and loss of ground seal. Water snakes are used on uneven surfaces and around building corners, and do not fill in gaps between the tarps and ground seal. Underground drains are not sealed. Fumigator cannot determine where fumigant is leaking from the ground seal. Dry soil around structure contributes to poor seals. 	<ol style="list-style-type: none"> Rake mulch, leaf litter, gravel and other debris away from structure before placing tarps on ground. Use sand to fill in gaps, such as where tarps are placed over steps, between the tarps and ground seal, and where perimeter soil meets concrete steps, driveway pavers and asphalt areas. Use snakes which are completely filled (sand, gravel or water). Use sufficient clamps to secure the ends of water snakes so they will not drain water during the fumigation. Overlap snakes about 1/3 their length. Gravel-filled snakes are heavier than sand snakes and can be shaped to fit the terrain. Inspect water snakes for abrasion and leakage of water in these areas. Mend or replace worn water snakes. Water snakes are best used on flat surfaces along straight building foundations. Do not cap off bag at both ends until water is flowing out opposite end from the fill end to remove air in the snake. If the water snake contains too much air, it will not sink into depressions in the ground. Seal underground drains. Use a TIF leak detector, SF-ExplorIR or similar devices to locate ground seal leaks and fix them. Request the customer water the soil adjacent to the exterior perimeter of structure the day prior to fumigation to improve seal condition. (Note – do not apply water inside crawlspaces prior to fumigation.)

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Wind (mph)	One of five factors the Fumiguide™ uses to estimate HLT. The Fumiguide calculates fumigant application rates for wind speeds of 0-25 mph. The lower the wind speed, the better the confinement of Vikane® fumigant, the higher the HLT, and less Vikane is required to accumulate the target dosage	<ol style="list-style-type: none"> 1. Fumigator does not measure wind speed. 2. Tarp seams are not secured for high or gusting winds. 3. Snakes are not secured for high or gusting winds. 4. Tarps are not secured to the roof, especially on flat roofs, to prevent them from lifting in windy conditions. 5. Clamped seams on tarps are not rechecked to make tarped panels tight, allowing wind to create a bellows affect with the tarps. 6. Large spans of tarp covering open areas of structure such as balconies and walkways are unsupported, which may place too much weight on clamped seams. 	<ol style="list-style-type: none"> 1. Use a weather radio or weather app on a phone to determine current and predicted wind speed during the fumigation period. 2. On windy days, place clamps closer together (such as every 6 inches). Double or triple clamp when appropriate. Use rope to reinforce critical seams in high wind. 3. Use double or triple sand snakes in high or gusting winds. Place sand snakes against water snakes or clamp tarp around water snakes to keep them from rolling off tarps in gusting winds. 4. Place snakes and/or rolled tarps on roof of tarped structure to prevent tarps from lifting off the roof. 5. Tighten clamped side and roof panels to help minimize tarp bellowing in windy conditions. 6. Support the tarp weight by using ball pulls, ropes, or attaching tarps to the structure. Obtain prior permission if using intrusive methods (such as furrowing strips and nails) to attach tarps to the structure.
Size of Structure (MCF)	One of five factors the Fumiguide uses to estimate HLT. The Fumiguide calculates fumigant application rates for structures 1-5000 MCF. The larger the structure, the better the confinement of Vikane, the higher the HLT, and less Vikane is required to accumulate the lethal dosage. This is because the larger the structure, the smaller the ratio of surface area (where fumigant is lost) to volume (which serves as the reservoir for fumigant).	Structure is incorrectly measured.	<ol style="list-style-type: none"> 1. Fumigator should always remeasure structure with an appropriate measuring device prior to fumigant introduction. Measurements should take into account voids created by tarps. For example, perimeter dimensions should be taken from eave to eave where tarps are dropped, and not from the foundation. 2. Include the volume of all areas which are under the tarps, such as porches, decks, chimneys, etc.

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Underseal	One of five factors the Fumiguide™ uses to estimate HLT. The underseal is rated by slab or soil type (sand, sandy loam, loam, or clay) for crawl space foundations. The less porous the underseal (slab is the best, sand in a crawl space is the worst), the better the confinement of Vikane® fumigant, the higher the HLT, and less Vikane is required to accumulate the target dosage. The underseal rating in crawlspaces can be improved to “clay” or better by installing tarps or a polyethylene vapor barrier.	<ol style="list-style-type: none"> For structures with part slab and part crawlspace foundations, the fumigator does not estimate the HLT based on the soil type in the crawlspace. Structure is rated as a slab foundation when part of the structure contains a crawlspace. Fumigator does not properly rate soil type for crawlspace. 	<ol style="list-style-type: none"> Use the most porous underseal of the structure to estimate the HLT, because the fumigant will follow the path of least resistance to dissipate from the fumigation space. Carefully inspect the structure prior to fumigation to determine the correct underseal rating. Monitor crawlspace fumigations to determine the proper soil type rating for your geography.
Monitoring a Fumigation	The purpose of monitoring a fumigation is to determine the actual HLT and confirm dosage accumulation. Monitoring requires using a Fumiscope or similar device to measure concentrations of Vikane in the fumigated space at two or more time intervals. The Fumiguide increases the dosage of Vikane by 33% when fumigations are not monitored to provide a margin for error. Fumigators can reduce fumigant cost when a fumigation is monitored.	<ol style="list-style-type: none"> Fumigator uses Fumiguide to estimate HLT for a tape-and-seal fumigation, and does not monitor. Monitoring hoses are placed only in fumigant introduction areas. Fumiscope is not calibrated for Vikane. Fumiscope is not set to measure Vikane. Monitoring lines are not completely purged before taking reading on the Fumiscope or similar monitoring device. Fumiscope is not corrected for drift in readings, resulting in higher concentrations of fumigant being recorded than actually exist in the fumigated space. 	<ol style="list-style-type: none"> The Fumiguide System was developed for tarped fumigations. All tape-and-seal fumigations should be monitored. Place at least half of the monitoring hoses in areas away from fumigant introduction. Place one hose per floor and per section (wing, tower) of the fumigated space. Place monitoring hoses in attics and crawl spaces, if accessible. Have Fumiscope calibration checked annually. Calibration can be conducted by the manufacturer of the Fumiscope (Key Chemical and Equipment) or by Douglas Products or distributor representatives who have the appropriate gas calibration kits. Make certain the Fumiscope is set to “Vikane,” not “methyl bromide.” Allow sufficient time for the Fumiscope to pull a new air sample from the fumigated space; it takes about 3 minutes to purge 100 feet of ¼-inch ID monitoring hose using the Fumiscope pump. A separate pump can be used to decrease the time required to pull a new air sample through a monitoring line. Allow at least 15 minutes for the Fumiscope to warm up before taking readings. Rezero the Fumiscope after measuring the fumigant concentration in a monitoring line.

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Amount of Fumigant Introduced Into a Structure	The amount of fumigant introduced is determined by the exposure time and dosage, volume of fumigation space, and dosage to be accumulated.	Fumigation scales are not calibrated.	Fumigation scales should be periodically calibrated. The weight of a full cylinder of Vikane® fumigant can be used to check scale calibration. When weighing a full cylinder, add 125 pounds for the weight of Vikane to the tare weight stamped on the cylinder to determine if your scales are measuring this value.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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