



GETTING THE MOST OUT OF FUMIGATION

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 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.

Target Pest and Life Stage

Effect on Accumulating Dosage

Dosage (g-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 ProFume® fumigant than that needed to kill drywood termites. The egg stage of insects may require 4- to 54-fold the dosage of ProFume needed to kill adults. Dosages are expressed as multiples of the drywood termite dosage. The maximum label dosage for ProFume is 10X the drywood termite dosage.

Errors

- 1 Misidentifying target pest can result in selecting inadequate dosage with ProFume.
- 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 ProFume (10X the drywood termite dosage) for control.

How to Prevent Errors

- 1 Have an 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

Effect on Accumulating Dosage

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. ProFume is not applied when the temperature at the site of an insect pest is below 4.4°C (this does not apply to fumigations for rodent control).

Errors

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.

How to Prevent Errors

For slab foundations, measure slab temperature indoors using a surface thermometer or IR thermometer.

For crawlspace foundations, measure soil temperature 5-7 cm below the soil surface on a shaded side of the foundation using a probe thermometer or IR thermometer.



Size of Structure (M³)

Effect on Accumulating Dosage

One of five factors the Fumiguide™ program uses to estimate HLT. The Fumiguide calculates fumigant application rates for structures 1-283167 m³. The larger the structure, the better the confinement of ProFume® fumigant, the higher the HLT, and less ProFume 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).

Errors

Structure is incorrectly measured.

How to Prevent Errors

- 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.

Underseal

Effect on Accumulating Dosage

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 ProFume, the higher the HLT, and less ProFume 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.

Errors

- 1 For structures with part slab and part crawlspace foundations, the fumigator does not estimate the HLT based on the soil type in the crawlspace.
- 2 Structure is rated as a slab foundation when part of the structure contains a crawlspace.
- 3 Fumigator does not properly rate soil type for crawlspace.

How to Prevent Errors

- 1 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.
- 2 Carefully inspect the structure prior to fumigation to determine the correct underseal rating.
- 3 Monitor crawlspace fumigations to determine the proper soil type rating for your geography.

GETTING THE MOST OUT OF FUMIGATION

Exposure Period

Effect on Accumulating Dosage

Dosage (g-hr) = concentration (g/m³) × time (hr).
If the time (exposure period) is reduced, then the amount of fumigant applied (concentration) must be increased. The Fumiguide™ program calculator and app calculate dosages for exposure periods from 2-72 hr. Fumigation periods of less than 4 hrs are not recommended for many insect and arthropod pests.

Errors

- 1 Fumigation tarps are taken down prematurely due to route scheduling problems or lack of tenting materials for new jobs.
- 2 Fumigator does not deduct one hour from fumigation period to determine the actual exposure period.

How to Prevent Errors

- 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, the exposure period begins one hour after introduction of ProFume® fumigant ends. The hour provides time for the fumigant to reach equilibrium (distribute within voids and insect galleries) throughout the fumigated space.

Tarp Condition

Effect on Accumulating Dosage

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 ProFume, the higher the HLT, and less ProFume is required to accumulate the target dosage.

Errors

- 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.

How to Prevent Errors

- 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.

Seal Condition

Effect on Accumulating Dosage

One of five factors the Fumiguide™ program 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 ProFume® fumigant, the higher the HLT, and less ProFume is required to accumulate the target dosage. Poor ground seal is the most common reason for fumigant loss.

Errors

- 1 Excessive leakage due to mulch, gravel, leaf litter and other debris under tent on ground seal.
- 2 Gaps exist between the tarps and the ground seal, particularly over uneven surfaces.
- 3 Snakes are incompletely filled and do not properly secure tarps to make a tight ground seal.
- 4 Snakes are not properly overlapped to create a continuous ground seal.
- 5 Sand-filled snakes can get hard or clumpy when wet and may not mold to the terrain.
- 6 Water snakes can abrade with usage, causing a gradual water leakage and loss of ground seal.
- 7 Water snakes are used on uneven surfaces and around building corners, and do not fill in gaps between the tarps and ground seal.
- 8 Underground drains are not sealed.
- 9 Fumigator cannot determine where fumigant is leaking from the ground seal.
- 10 Dry soil around structure contributes to poor seals.

How to Prevent Errors

- 1 Rake mulch, leaf litter, gravel and other debris away from structure before placing tarps on ground.
- 2 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.
- 3 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.
- 4 Overlap snakes about 1/3 their length.
- 5 Gravel-filled snakes are heavier than sand snakes and can be shaped to fit the terrain.
- 6 Inspect water snakes for abrasion and leakage of water in these areas. Mend or replace worn water snakes.
- 7 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.
- 8 Seal underground drains.
- 9 Use a TIF leak detector, SF-ExplorIR or similar devices to locate ground seal leaks and fix them.
- 10 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.)

GETTING THE MOST OUT OF FUMIGATION

Wind (kph)

Effect on Accumulating Dosage

One of five factors the Fumiguide™ program uses to estimate HLT. The Fumiguide calculates fumigant application rates for wind speeds of 0-40 kph. The lower the wind speed, the better the confinement of ProFume® fumigant, the higher the HLT, and less ProFume is required to accumulate the target dosage.

Errors

- 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.

How to Prevent Errors

- 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 15 cm). 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.

Amount of Fumigant Introduced Into a Structure

Effect on Accumulating Dosage

The amount of fumigant introduced is determined by the exposure time and dosage, volume of fumigation space, and dosage to be accumulated.

Errors

Fumigation scales are not calibrated.

How to Prevent Errors

Fumigation scales should be periodically calibrated. The weight of a full cylinder of ProFume can be used to check scale calibration. When weighing a full cylinder, add 67.5 kilograms for the weight of ProFume to the tare weight stamped on the cylinder to determine if your scales are measuring this value.

Monitoring a Fumigation

Effect on Accumulating Dosage

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 ProFume® fumigant in the fumigated space at two or more time intervals. The Fumiguide™ program increases the dosage of ProFume by 33% when fumigations are not monitored to provide a margin for error. Fumigators can reduce fumigant cost when a fumigation is monitored.

Errors

- 1 Fumigator uses Fumiguide to estimate HLT for a tape-and-seal fumigation, and does not monitor.
- 2 Monitoring hoses are placed only in fumigant introduction areas.
- 3 Fumiscope is not calibrated for ProFume.
- 4 Fumiscope is not set to measure ProFume.
- 5 Monitoring lines are not completely purged before taking reading on the Fumiscope or similar monitoring device.
- 6 Fumiscope is not corrected for drift in readings, resulting in higher concentrations of fumigant being recorded than actually exist in the fumigated space.

How to Prevent Errors

- 1 The Fumiguide was developed for tarped fumigations. All tape-and-seal fumigations should be monitored.
- 2 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.
- 3 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.
- 4 Make certain the Fumiscope is set to "ProFume," not "methyl bromide."
- 5 Allow sufficient time for the Fumiscope to pull a new air sample from the fumigated space; it takes about 3 minutes to purge 30 meters of 3-mm 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.
- 6 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.



®™Trademark of Douglas Products

Always read and follow label directions. These materials have been created specifically for ProFume and no other fumigant. These materials may not be copied, whole or in part, or reproduced without the permission of Douglas Products.

©2018 Douglas Products. U75-100-016-ZAF (08/18)



254592006