

GRAIN STORAGE FACT SHEET

GRAIN FUMIGATION – A GUIDE

In order to kill grain pests at all stages of their life cycle (egg, larva, pupa, adult), phosphine gas needs to reach, and be maintained at, a concentration possible only in a gas-tight storage.

KEY POINTS

- ▶ To control insects at all life stages the only option is to fumigate in a gas-tight storage.
- ▶ Cool grain temperatures require a longer fumigation period.
- ▶ Aeration fans fitted on gas-tight silos provide a number of benefits including a shorter ventilation period following a fumigation.



PHOTO: DARVA

Avoid exposure: Wearing full Personal Protective Equipment (PPE), work with phosphine in an open, well-ventilated area with the wind coming from the side.

The total time required for effective fumigation ranges from 10–17 days, accounting for the minimum exposure period, ventilation and withholding period.

This highlights the importance of monitoring grain regularly and at least 17 days before out-loading to allow sufficient time to fumigate if required.

Rates for success

When determining how much phosphine to apply, it is important to treat the entire storage volume, regardless of how much grain is contained inside. For example, a 100 tonne silo full of grain requires 200 phosphine tablets. If that same 100t silo is only half full of grain, it still requires 200 phosphine tablets for effective fumigation.

Handle with care

Phosphine is a highly toxic gas with potentially fatal consequences if handled incorrectly. As a minimum requirement, the label directs the use of cotton overalls buttoned at the neck and wrist, eye protection, elbow-length PVC gloves and a breathing respirator with combined dust and gas cartridge.

Where to apply

Arrange the tablets where as much surface area as possible is exposed to air, so the gas can disperse freely throughout the grain stack.

Spread phosphine tablets evenly across trays before hanging them in the head space or placing them level on the grain surface inside a gas-tight, sealed silo.

Hang bag chains in the head space or roll out flat on the top of the grain so air can freely pass around them as the gas dissipates.

Bottom-application facilities must have a passive or active air circulation system to

carry the phosphine gas out of the confined space as it evolves. Without air movement, phosphine can reach explosive levels if left to evolve in a confined space.

Time to kill

To control pests at all life stages and prevent insect resistance, phosphine gas concentration needs to reach 300 parts per million (ppm) for seven days (when grain is above 25°C) or 200ppm for 10 days (between 15–25°C). Insect activity is slower in cooler grain temperatures so require longer exposure to the gas to receive a lethal dose.

TABLE 1 APPLICATION RATES FOR PHOSPHINE TABLETS IN STORAGE

STORAGE CAPACITY		NUMBER OF TABLETS REQUIRED
TONNES WHEAT	CUBIC METRES	
1	1.3	2
50	65	100 (1 tin)
100	130	200 (2 tins)
200	260	400 (4 tins)
300	400	600 (6 tins)

Source: Nufarm

Gas venting

Following fumigation, ventilate silos so grain can be delivered free from harmful gas residues.

With tablet residue or bag chains removed, leave silos open for no less than five days, or no less than one day with aeration fans operating.

The final step is to hold grain for a further two days after ventilation before using for human consumption or stockfeed.



Start a pressure test with equal oil levels on the middle marker.

Pressurise silo to create a difference in oil levels of 25mm.

The time taken for the oil levels to drop from 25mm apart to 12mm apart must be no less than five minutes on new silos. For older silos, three minutes is acceptable.

FURTHER READING

Fumigating with phosphine, other fumigants and controlled atmospheres (Booklet) Print

1800 11 00 44

Email ground-cover-direct@canprint.com.au

Web www.storedgrain.com.au ; www.grdc.com.au/Resources/Publications/2012/08/Fumigating-with-Phosphine-other-fumigants-and-controlled-atmospheres

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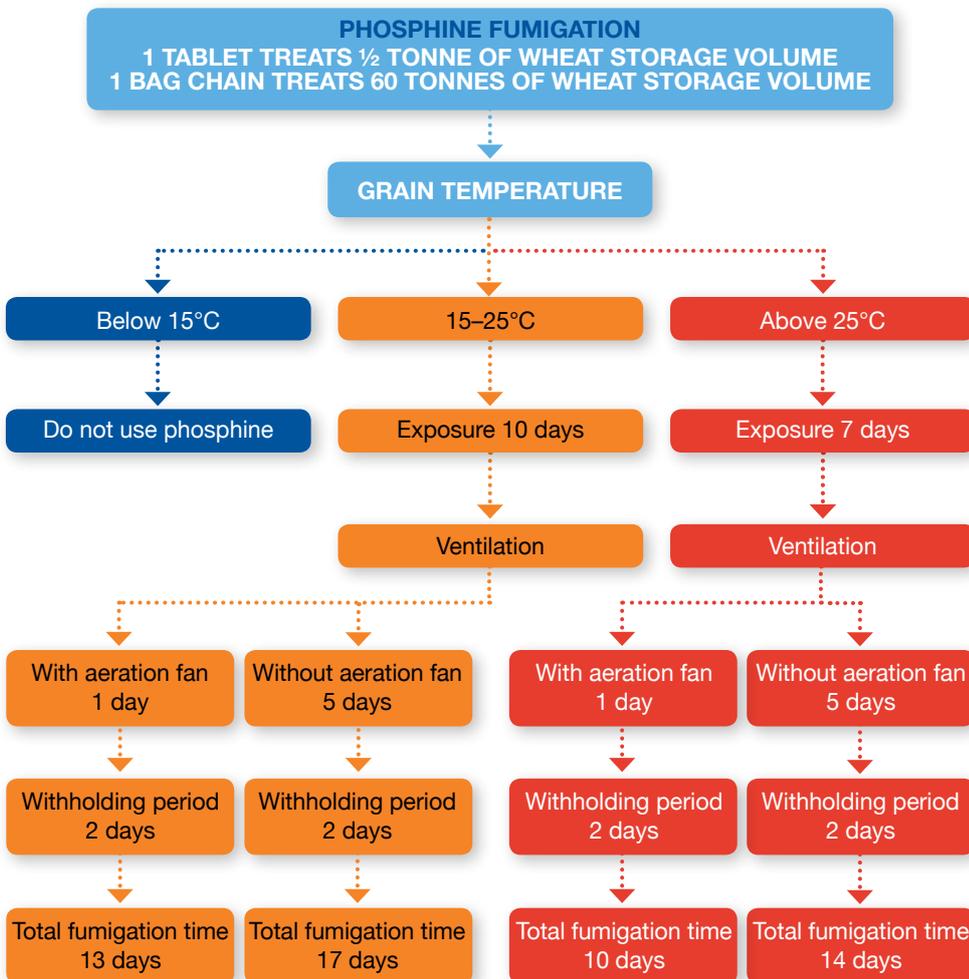
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PHOSPHINE FUMIGATION PERIOD



Source: Kondinin Group

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