

# **TYPES OF FUMIGATION - FARM BINS (BUTLER TYPE) - PELLETS**

## General Information

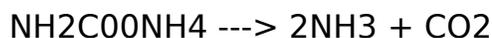
### INTRODUCTION

FUMITOXIN tablets and pellets are used to protect stored commodities from damage by insects and other vertebrate pests. Fumigation of stored products with FUMITOXIN in the manner prescribed in the labeling does not contaminate the marketed commodity. FUMITOXIN metal phosphide fumigants are acted upon by atmospheric moisture to produce phosphine gas.

FUMITOXIN tablets and pellets contain aluminum phosphide (AIP) as their active ingredient and will liberate phosphine via the following chemical reaction:

Phosphine gas is highly toxic to insects, burrowing pests, humans, and other forms of animal life. In addition to its toxic properties, the gas will corrode certain metals and may ignite spontaneously in air at concentrations above its lower flammable limit of 1.8% (v/v). These hazards will be described in greater detail later on in this Applicator's Manual.

FUMITOXIN also contains ammonium carbamate, which liberates ammonia and carbon dioxide as follows:



These gases are essentially nonflammable and act as inerting agents to reduce fire hazards.

FUMITOXIN is prepared in two spherical shapes. The rounded tablets weigh approximately 3 grams and will release 1 gram of phosphine gas. They are about 16mm in diameter. The pellets are about 10 mm in diameter, weigh approximately 0.6 gram and release 0.2 gram of phosphine gas.

FUMITOXIN Tablets are provided in 21kg cases, contain 14 resealable, gas-tight flasks of 500 tablets each or, 70 flasks of 100 tablets each.

FUMITOXIN Pellets are provided in 21kg cases containing 14 resealable, gas-tight flasks of 1660 pellets each or, 14 flasks of 2490 pellets each.

Upon exposure to air, FUMITOXIN pellets and tablets begin to react with atmospheric moisture to produce small quantities of phosphine gas. These reactions start slowly, gradually accelerates and then tapers off again as the aluminum phosphide is spent. FUMITOXIN pellets react somewhat faster than do the tablets. The rates of decomposition of the tablets and pellets will vary depending upon moisture and temperature conditions. For example, when moisture and temperature of the fumigated commodity are high, decomposition of FUMITOXIN may be complete in less than 3 days. However, at lower ambient temperatures and humidity levels, decomposition of FUMITOXIN may require 5 days or more. After decomposition, FUMITOXIN leaves a gray-white powder composed almost entirely of aluminum hydroxide and other approved inert ingredients. This will cause no problems if the fumigant has been added directly to a commodity such as grain. However, the spent powder must usually be retrieved for disposal after space fumigations. If properly exposed, the spent FUMITOXIN will normally contain only a small amount of unreacted aluminum phosphide and may be disposed of without hazard. While spent FUMITOXIN is not considered a hazardous waste, partially spent residual dusts from incompletely exposed FUMITOXIN will require special care. Precautions and instructions for further deactivation and disposal will be given under Section 28 of this Manual.

FUMITOXIN tablets and pellets are supplied in gas-tight containers and their shelf life is unlimited as long as the packaging remains intact. Once opened for fumigation, the aluminum flasks of tablets or pellets may be tightly resealed and stored for future use. Storage and handling instructions will be given in detail under Section 19 of this Manual.

## PESTS CONTROLLED

FUMITOXIN has been found effective against vertebrate and the following insects and their preadult stages - that is, eggs, larvae and pupae. Although it is possible to achieve total control of the listed burrowing insect pests, this is frequently not realized in actual practice. Factors contributing to less than 100% control are leaks, poor gas distribution, unfavorable exposure conditions, etc. In addition, some insects are less susceptible to phosphine than others. If maximum control is to be

attained, extreme care must be taken in sealing, higher dosages must be used, exposure periods lengthened, proper application procedures followed, and temperature and humidity conditions must be favorable.

## COMMODITIES, WHICH MAY BE FUMIGATED WITH FUMITOXIN

FUMITOXIN may be used for the fumigation of listed raw agricultural commodities, animal feed and feed ingredients, processed foods, tobacco and certain other nonfood items when their commodity temperature is above 40°F(5° C).

### Raw Agricultural Commodities, Animal Feed and Feed Ingredients

FUMITOXIN tablets and pellets may be added directly to animal feed feed ingredients and raw agricultural commodities stored in bulk. For these commodities not stored in bulk, FUMITOXIN may be placed in moisture permeable envelopes, on trays, etc., and fumigated as with processed foods.

## PROCESSED FOODS

Processed foods may be fumigated with FUMITOXIN. Under no condition shall any processed food or bagged commodity come in contact with FUMITOXIN tablets, pellets or residual dust except that FUMITOXIN may be added directly to processed brewer's rice, malt, and corn grits for use in the manufacture of beer.

### Nonfood Commodities, Including Tobacco

The listed nonfood items that may be fumigated with FUMITOXIN. tablets, pellets or residual dust should not contact tobacco and certain other of the nonfood commodities.

## EXPOSURE CONDITIONS

The following table may be used as a guide in determining the minimum length of the exposure period at the indicated temperatures:

### Minimum Exposure Periods for FUMITOXIN

#### Temperature Pellets Tablets

40oF (5oC) Do not fumigate Do not fumigate

41o-53oF (5-12oC) 8 days (192 hours) 10 days(240 hours)

54o-59oF (12-15oC) 4 days (96 hours) 5 days (120 hours)

60o-68oF (16-20oC) 3 days (72 hours) 4 days (96 hours)

above 68oF (20oC) 2 days (48 hours) 3 days (72 hours)

The fumigation must be long enough so as to provide for adequate control of the insect pests that infest the commodity being treated.

Additionally, the fumigation period should be long enough to allow for more or less complete reaction of FUMITOXIN with moisture so that little or no unreacted aluminum phosphide remains. This will minimize worker exposures during further storage and/or processing of the treated bulk commodity as well as reduce hazards during the disposal of partially spent aluminum phosphide products remaining after space fumigations. The proper length of the fumigation period will vary with exposure conditions since, in general, insects are more difficult to control at lower temperatures, and the rate of hydrogen phosphide gas production by FUMITOXIN is lower at lower temperatures and humidities.

It should be noted that there is little to be gained by extending the exposure period if the structure to be fumigated has not been carefully sealed or if the distribution of gas is poor and insects are not subjected to lethal concentrations of phosphine. Careful sealing is required to ensure that adequate gas levels are retained and proper application procedures must be followed to provide satisfactory distribution of phosphine gas. Application of additional FUMITOXIN is recommended if phosphine concentrations drop below an effective level. If re-entry into the treated structure is required, follow the requirements for manpower and respiratory protection usage found under Section 10 in this manual.

Some structures can only be treated when completely tarped while others cannot be properly sealed by any means and should not be fumigated. Exposure times must be lengthened to allow for penetration of gas throughout the commodity when fumigant is not uniformly added to the commodity mass, for example, by surface application or shallow probing. This is particularly important in the fumigation of bulk commodity contained in large storages.

Remember, exposure periods recommended in the table are minimum periods and

may not be adequate to control all stored products pests under all conditions nor will they always provide for total reaction of FUMITOXIN.

It is permissible and often desirable to use a low-flow recirculation system for phosphine gas in certain bulk storages. This method may be used in ship's holds, various types of flat storage and vertical storage bins. Recirculation usually involves the application of fumigant to the surface of the commodity. The phosphine gas is then continuously or intermittently drawn out of the over space and blown into the bottom of the storage using specially designed low volume fans and ductwork. This method facilitates the quick and uniform penetration of phosphine throughout the commodity. In some instances a reduced dosage may be used. Please contact Degesch America, Inc. if assistance is required in designing the recirculation system.

#### Limitations, Restrictions, and Exceptions

#### Recommended FUMITOXIN Dosages for Various Types of Fumigation

One (1) FUMITOXIN tablet or five (5) FUMITOXIN pellets will produce a concentration of 25 parts per million (ppm) of phosphine gas (PH<sub>3</sub>) in a volume of 1000 cubic feet. (1 gram PH<sub>3</sub>/1000 cu.ft. is equivalent to 25 ppm).

Although it is permissible to use the maximum dosage listed above, the following recommended dosage ranges can be used as a guideline for various types of fumigation. When a dosage range is recommended, use the higher rate under conditions of severe infestation, lower temperature and other applicable variables.

Higher dosages are recommended in structures that are of loose construction and in the fumigation of bulk stored commodities in which diffusion will be slowed and result in poor distribution of hydrogen phosphide gas.

Method

[Fumigant](#)

Timings

[N.A.](#)