

REASONS FOR FUMIGATION FAILURES

Insufficient Fumigant: Because the efficiency of a fumigant depends on the maintenance of a killing concentration in the grain, any factor that affects gas concentration is important. You cannot get satisfactory results by applying less than the recommended dosage (a common problem). Be sure to use the amount of fumigant required for the capacity of the bin, not the amount of grain contained in the bin.

Storage Structure: A loosely constructed, leaky bin may not retain fumigants long enough to kill the insects while a tight concrete or metal bin may hold the fumigant in killing concentrations for several days. The depth of the grain in relation to its surface area also affects the efficiency of a fumigant. In general, the greater the surface area of the grain in proportion to the bulk, the greater the difficulties encountered in fumigation. This is the practical reason (except for leaks) that flat storages require higher dosages than round silo-type bins. Storage structures with a large amount of space over the grain are also difficult to fumigate effectively, as large amounts of gas escape into the head space.

Type of Grain and Dockage: The kind of grain affects the efficiency of a fumigant in accordance with its sorption quality. For example, shelled corn and grain sorghum appear

to be much more sorptive than wheat. Wheat with dockage exceeding 3% requires nearly twice the dosage than wheat with less than 1% dockage requires.

Moisture: The moisture content of the grain has a profound effect on the efficiency of a fumigant - the higher the moisture content, the higher the dosage required. As the moisture content increases above 12%, a proportionally higher dosage is required. Generally you cannot satisfactorily fumigate grain having a surface moisture content of 15% to 20% because the fumigant vapors will not penetrate the moist layer.

Temperature: During fumigation the gas quickly assumes the temperature of the grain. An increase in temperature results in greater molecular activity of gases, which facilitates the diffusion and penetration of the fumigant. However, there are limiting factors for both extremes of high or low temperatures. If grain temperature reaches 115° F, the fumigants vaporize very rapidly and may escape from the bin before lethal gas concentrations can be obtained. Most stored grain insects cannot survive in grain at 115° F or above, thus eliminating the need for fumigating. You need not fumigate stored grain with a temperature of 60° F or below as the insects are inactive at this temperature.