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*भारतीय मानक मसौदा*

**घरेलू डिब्बों में अनाज को कीटाणुरहित करने के लिए धूम्रिकरण की प्रभावकारिता का  
परीक्षण – परिक्षण की पद्धति**

*(आई एस 7716 का पहला पुनरीक्षण)*

*Draft Indian Standard*

**Testing Efficacy of Fumigation for Disinfestation of Grains in Domestic Bins – Method  
of Test**

*(First Revision of IS 7716)*

ICS 67.060; 01.040.65

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Foodgrains, Allied Products, and Other  
Produce Sectional Committee, FAD 16

Last Date of Comments: 25 March 2024

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**FOREWORD**

*(Formal clause would be added later)*

Efficacy of a fumigant for its toxicity to insect pests in a storage bin is required to be evaluated for ascertaining proper disinfestation. Therefore, in order to make the fumigation operations more certain, comparative efficacy of various fumigants is tested. Accordingly, this Indian Standard was published in 1975 to provide a uniform procedure for efficacy of fumigants and interpretation of results.

This revision is being undertaken to update the standard with latest technological advancements and major changes include:

- a) Use of gas Indicator has been replaced by Gas Monitor; and
- b) Fumigant ethylene dibromide has been deleted, use of Ethylene Dibromide has been completely banned by Directorate of Plant Protection, Quarantine, and Storage vide S.O. 682 (E) dated 17 July 2001.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding-off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## **1 SCOPE**

This standard prescribes method for testing efficacy of fumigation for disinfestation of grains in domestic bins.

## **2 REFERENCES**

The following standards contain provisions, which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard is encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
IS 6151 (Part 1) : 2020	Storage management code part 1 terminology ( <i>first revision</i> )

## **3 TERMINOLOGY**

For the purpose of this standard, the definitions of various terms given in IS 6151 (Part 1) shall apply.

## **4 APPARATUS**

**4.1 Gas Monitor** – For aluminium phosphide, range, 2.0 to 4800 mg/m<sup>3</sup>, for ethylene dichloride and carbon tetrachloride mixture, range, 18 to 37000 mg/m<sup>3</sup>. Resolution, 1 mg/m<sup>3</sup>,

### **4.2 Insect Cages**

## **5 TEST FUMIGANTS**

### **5.1 Aluminium Phosphide Tablets/ Pouches**

### **5.2 Ethylene Dichloride and Carbon Tetrachloride Mixture**

## **6 PROCEDURE**

**6.1** The efficacy of a fumigant is evaluated at a dose that will normally produce lethal concentration of gaseous fumigant in the treated space during a specified duration of time or exposure period. Hence, various factors are taken into account while evaluating the efficacy of fumigation in a domestic bin.

**6.2 Dose** – Calculate the fumigant dose in bulk grain either on volume basis, that is, per m<sup>3</sup>.

**6.2.1** Aluminium phosphide tablets at the rate of 6 g/tonne or 4.2 g/m<sup>3</sup> and EDCT mixture at the rate of 300 g/m<sup>3</sup> may be used.

**6.3** Determine the concentration of gas fumigant in the volume of treated space in mg/m<sup>3</sup>, with the help of a gas monitor.

**6.4** The exposure period or duration of fumigation should be 7 days.

**6.5** Major and minor pests which cause damage to the food grains during storage may be used for the tests. These pests may be rice weevil (*Sitophilus oryzae*), lesser grain borer (*Rhizopertha*

*dominica*), *khapra* beetle (*Trogoderma granarium*), red rust flour beetle (*Tribolium castaneum*), saw-toothed grain beetle (*Oryzaephilus surinamensis*), pulse beetle (*Calosobruchus chinensis*), grain moth (*Sitotroga cerealella*), etc. Usually red rust flour beetle and *khapra* larvae may be used in the tests. Grain infested with larvae and pupae of borers should also be used for making the assessment.

**6.6** Take specified number of these pests, say 50, in insect cages containing the same grains with which the bin is filled. Insert these cages in the bin at different depths – top, middle and bottom, in the periphery and in the middle of the bulk grain. Fumigate the bin and after the above exposure period (*see 6.4*) count the mortality of insects.

## **7 TEST RESULTS**

Express the result as percent kill. The fumigant, its dosage, application technique and the air-tightness of the bin shall be considered satisfactory, if mortality obtained is 100 percent.