NSPM 22

Guidelines for Assessment, Audit and Accreditation of Fumigation Agencies for Undertaking Aluminium Phosphide Fumigation

Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
Directorate of Plant Protection, Quarantine & Storage
N.H-IV, Faridabad-121001

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Endorsement

This standard entitled **'*Guidelines for Assessment, Accreditation and Audit of Fumigation Agencies*'** prepared by the Directorate of Plant Protection, Quarantine & Storage, Faridabad-121001 during 2011 for rendering guidance in assessment, audit and accreditation of fumigation operators for undertaking effective fumigation operations as per provisions of the standard on '***Quarantine Treatments and Application Procedures: 2. Aluminium Phosphide fumigation'*.** This standard has been prepared in view of technological advancements and need of the hour. This standard replaces the guidelines mentioned in the Manual for Fumigation Operators developed by Directorate of PPQ&S, N.H. IV, Faridabad during 1997.

This standard is duly approved for adoption and shall come into force from August, 2011.

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(Dr. V. K. Yadav)
Plant Protection Adviser
Directorate of Plant Protection, Quarantine & Storage,
NH-IV., Faridabad-121001
Date: August, 2011**.**

Review & Amendment

This standard will be subject to periodic review and amendment as may be decided by the Plant Protection Adviser. This standard shall be updated and revised with the advancement of techniques and need of the hour, if necessary. The holders of this standard shall ensure that the current edition of this standard is being used.

Control & Distribution of the standard

The master copy of this standard shall be held by the Plant Protection Adviser and the controlled copies distributed by Additional Plant Protection Adviser (PQ), Dte of Plant Protection Quarantine & Storage, Faridabad to all PQ stations and all accredited officers of Dte of PPQS/Fumigation Agencies. This standard will be hosted on Directorate website www.plantquarantineindia.org for easy access to all the concerned. The standard can be freely reproducible for official use and any alterations and modifications to this standard shall be made only with the written approval of the Plant Protection Adviser. Any enquiries regarding this standard shall be made to the J Additional Plant Protection Adviser (PP), PQ Division, Directorate of Plant Protection Quarantine & Storage, Faridabad-121001.

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INTRODUCTION

Scope

This standard sets out guidelines for assessment, audit and accreditation of fumigation operators for undertaking fumigation operations with Aluminium Phosphide as per the provisions contained in **Insecticides Act, 1968 and Rules 1971.**

Background

Fumigation is an approved treatment method extensively used for controlling pest infestation in agricultural products in many countries of the world. The Phytosanitary regulations of many countries require certain commodities to be fumigated just prior to export and require the fumigation treatment to be endorsed on the Phytosanitary certificate or the fumigation certificate issued by an approved fumigation agency to accompany the consignment, clearly detailing the treatment. Phosphine fumigant (Aluminium Phosphide) can be used to fumigate staked materials by covering with a tarpaulin made from plastic sheeting. This allows fumigant to be contained to the treated material only. The most important aspect of a successful fumigation with any fumigant is the degree to which the space is sealed. Containers, trucks, vans and other transport vehicle shipped by rail may be fumigated in-transit. However, it is not legal to move such vehicles over public roads or highways until these have been aerated and warning placards removed. Consignee needs to be notified if the commodity is to be shipped under fumigation so that necessary precautions may be taken before unloading the commodity. Aluminium Phosphide generates Phosphine gas when exposed to water molecules in atmosphere. The Phosphine is highly toxic to insects, human beings and other forms of animal life. In addition to its toxic properties, the gas may corrode certain metals and may ignite spontaneously in air at concentration greater than its lower flammable limit of 1.8% (V/V) (17900ppm).

References

DPPQS. 1997. Manual for Fumigation Operators, Directorate of Plant Protection, Quarantine & Storage, N.H-IV, Faridabad-121001 (India).

1. GENERAL REQUIREMENTS

1.1. Accreditation Authority

The Directorate of Plant Protection, Quarantine & Storage, under the Ministry of Agriculture shall be the authority for granting accreditation to fumigation agencies for performance of fumigation treatments with Aluminium Phosphide (ALP) under Accreditation Scheme. The Plant Protection Adviser shall accredit the fumigation operators for undertaking Aluminium Phosphide fumigation for pre-shipment treatments and quarantine purposes. The use of Aluminium Phosphide is restricted and it shall be used under the supervision of persons authorized by Plant Protection Adviser. The State Governments shall be responsible to issue license for sale/stock/use of Aluminium Phosphide fumigant only after necessary verification of certificate of approval granted to fumigation agency with accredited fumigation operator by PPA as per register of fumigation agencies maintained by the Directorate at its website: www.plantquarantineindia.org ..

1.2. Registration Protocols

The Directorate of Plant Protection, Quarantine & Storage, N.H-IV, Faridabad-121001, will establish a central register of fumigation agencies with accredited fumigation operators as per the format prescribed in **Appendix-I**. In order to be registered with the Dte of PPQS, the fumigation agency must have accredited fumigation operator. The fumigation agency with accredited fumigation operator will be allotted a unique registration number and each accredited fumigation operator shall be assigned a unique accreditation number. The registered fumigation agency must record the registration / Certificate number in correspondence with the Dte of PPQS, N.H-IV, Faridabad-121001. The fumigation company or agency or organization seeking registration along with accredited fumigation operator shall be required to apply to the Plant Protection Adviser in format prescribed in **Appendix-II & III** with documents as specified along with a registration fee of Rs. 25,000/- payable by a bank draft in favour of '**Accounts Officer**, **Directorate of Plant Protection, Quarantine & Storage, Faridabad**' and duly signed compliance agreement (**Appendix-IV**). The registration of fumigation agency shall be granted for a period of one year initially and thereafter renewed every two years. The Registered Fumigation Agency shall apply for renewal at least 45 days prior to expiry of registration in the same format as prescribed in **Appendix-II** along with original registration certificate and renewal fee of Rs.15, 000/-. Dte of PPQS will conduct review assessment in line with the original approval process before granting renewal.

For accreditation of additional fumigation operator, the registered fumigation agency shall apply in same application form as prescribed in **Appendix-II** with a fee of Rs.5, 000/- and such accreditation shall be granted after necessary assessment as per Section 2.2.

Note: The registration certificate granted by the Plant protection Adviser is valid only as long as the accredited fumigation operator is working with that fumigation agency or company or organization. Dte of PPQS should be notified by the registered agency in writing of any changes in arrangements between registered fumigation company and the accredited fumigation operators or changes within the company. The accreditation granted to the fumigation operator shall be cancelled in the event of leaving the company.

1.3 Transfer of agency from one place to another within a State or from one State to another State:.

Agency is allowed to transfer the whole set up of the agency including staff from one place to another place within a State or from one State to other State with prior approval of Plant Protection Adviser. However, the Agency has to submit necessary documentary proof of facilities at new place along with the application for approval. Facility at new premises / site will be verified by a team of officers nominated by the PPA before granting approval. The application of transfer should be accompanied with a fee of Rs. 10,000/-. However, for shifting of agency within a city from one building to another building, the fee is exempted.

1.4 **Transfer of accredited fumigation operator from one branch to another branch by the agency**

(i) Transfer of fumigation operator from one branch to another branch of the agency is permitted with the prior approval of Plant Protection Adviser. The application should be accompanied with a fee of Rupees 5,000/- only.

(ii) Further on transfer, the period of recognition of validity of fumigation operator once granted will remain unchanged unless fumigation operator leaves the agency to which he is attached.

(iii) When any agency opens a new branch and transfer the fumigation operator from old branch, the agency will be assessed for the basic facilities at new place besides the fumigation operator.

1.5 **Renewal of approval of agency after expiry of validity period.**

(i) If an agency fails to apply for renewal of its approved registration at least 45 days before the date of expiry of the registration, agency will be suspended and shall not undertake fumigation operation till further order or revalidation of agency. A penal fee of Rs. 10,000/- will be charged for revalidation of the registration of such agency.

(ii) When an agency applies for renewal of registration within stipulated time period, but due to the procedural delay at Regional Plant Quarantine Stations, could not get it in time, the agency may continue operative work of fumigation till the receipt of renewed registration certificate. In case the Regional PQ station does not renew the registration within 30 days of the date of its expiry, the registration shall be deemed to have been renewed.

(iii) Qualifying percentage of Marks during Assessment of applicant for accreditation under NSPM-22.

Applicants will be examined for their technical competence through written and oral examinations. To qualify the test applicants must secure at least 75% marks in each of the said examination. If any candidate fails to qualify, he may appear for the said examination again but not earlier than 3 months of 1st assessment.

1.6 Responsibilities:

i) Responsibilities of Fumigation Agency

The fumigation company should:

- hold a valid approval certificate granted by the Plant Protection Adviser and a license to purchase, stock and use restricted pesticides granted by the Director of Agriculture of the concerned State;
- perform fumigation operations always under the supervision of accredited fumigation operator;
- advise the client on stocking of consignment for carrying out effective treatment;
- advise the client about the time requirements for complete and successful treatment of consignment;
- seek from the client information regarding any specific conditions attached to the treatment of consignment;
- inform the client of any other factors that affect treatment of commodity such as impervious package or sorptive nature of commodity;
- ensure adopting correct fumigation practices and follow safety precautions, while undertaking treatment operations;
- maintain proper records on stock and use of fumigant.
- issue fumigation certificate after ensuring that fumigation has been carried out effectively;.
- follow the guidelines stipulated in the standard and abide by instructions issued by the Plant Protection Adviser from time to time;
- ensure not to undertake fumigation in forbidden places unsafe to public and animal life or of forbidden commodities.
- Submit the information to Dte. of PPQ&S timely.
- Submit regularly the monthly report of various activities of agency including stock and use of restricted pesticides.

ii) Responsibilities of Fumigation Operator

- Not to undertake fumigation in residential areas where animal/human life exists.
- Display warning signs and take adequate safety precautions during fumigation.
- Ensure safety of workers during fumigation operations
- Undertake supervision of all fumigation operations.
- To monitor and detect gas leakage if any, and take appropriate measures to seal leakage, monitor gas concentration and aeration of fumigated commodities.
- To monitor / repair essential fumigation /safety equipments.
- To dispose off empty containers of fumigants in safe manner as per the Insecticides Act and Rules.
- To maintain appropriate records related to fumigation.

1.7. Fumigation Certification

All Aluminium Phosphide fumigation treatments should be undertaken by approved / registered fumigation companies under the supervision of accredited fumigation operator. Accredited Fumigation Operator, before issuing fumigation Certificate, shall:

- monitor the fumigation treatment to ensure that correct dosage of fumigant is applied and appropriate concentration of fumigant is maintained to make it effective
- affix an official stamp on the fumigation certificate with a unique accreditation number assigned to him;
- record all the details of fumigation in prescribed format confirming that the fumigation was carried out in accordance with this Aluminium Phosphide (ALP) Standard.

1.8. Treatment Under Supervision of Authorised PQ Officer

If a fumigation agency, in emergency (absence of accredited Fumigation Operator), wants to carry out fumigation treatment under the supervision of authorized PQ officer, the agency has to apply in prescribed format **(Appendix-XVII)** to PPA alongwith Demand Draft of Rs.1, 000/- per consignment drawn in favour of Account Officers, Directorate of PPQ & S, Faridabad. Work order will be issued by the competent authority in the prescribed format **(Appendix-XVIII).**

2. SPECIFIC REQUIREMENTS

2.1. Eligibility of Fumigation Operator

2.1.1. Educational Qualifications

The fumigation operator seeking recognition / accreditation with the Dte of PPQS shall possess the educational qualifications namely: B. Sc Degree in Agriculture or B. Sc Degree in Life Science / Bio-Science with Chemistry as one of the subject from any recognized University.

2.1.2.Training Requirements

The person having educational qualification as prescribed in Section 2.1.1 shall undergo training for a period of at least fifteen days at the training institute recognized by Govt. of India to be eligible to apply as operator. The training programme should be structured to impart technical skills and competency in performance of effective fumigation operations with Aluminium Phosphide. Besides, other aspects the training programme should include the following areas viz.,

- Regulations/National Standards
- Role of Regulating Agencies & Responsibilities of Fumigation Operators
- General principles of fumigation
- Physico-chemical properties /formulations of Aluminium Phosphide (ALP) and their safe use.
- Correct fumigation practices with ALP (correct / recommended dosage of fumigant; proper fumigant distribution; required exposure period; correct concentration of gas within fumigation chamber; proper understanding of temperature, humidity relationships and C X T relationship for effective fumigation)
- Detecting gas leakages / Measuring and monitoring gas concentration
- Use of safety equipment, first aid and safety precautions
- Factors contributing to success/failure of fumigation
- Ship fumigation, container / stack fumigation etc.

The training programme shall include power point presentations and demonstration of good fumigation practices as well as group interactions on specific problems and issues related to fumigation operations. There shall be a post training evaluation to assess adequacy of skills of fumigation operator.

2.2. Assessment Protocol

A panel at least of two technical experts approved by the Plant Protection Adviser, shall undertake the assessment of fumigation agency and the operator for accreditation. The technical experts must possess required skill competency in performance of effective fumigation operations with Aluminium Phosphide and be fully acquainted with the provisions of this ALP Standard including requirements for the accreditation of fumigation agency. The panel of experts after initial assessment shall submit a report to the Plant Protection Adviser in

the format prescribed in **Appendix-V.** for consideration of approval of fumigation agency with accredited fumigation operator.

2.2.1. Assessment of fumigation operator

The fumigation operator shall be assessed by a panel of technical experts approved by the PPA, for knowledge and skill competency to perform effective fumigation treatment in line with this Aluminium Phosphide Standard of Dte of PPQS.

The fumigation operator shall be assessed for:

- sound knowledge of regulatory requirements, principles of fumigation and general practices;
- ability to carry out the tests needed to ensure that the treatment is successful;
- ability to recognize and analyze the factors leading to successful fumigation as well as a failed or potential to fail fumigation operations;
- ability to comprehend the label requirements and hazards associated with the use of Aluminium Phosphide;
- ability to demonstrate the use of safety equipments and possess knowledge of Aluminium Phosphide poisoning, first aid and emergency and safety measures.
- capability to measure fumigant concentration in enclosure with the help of monitor and Threshold Limit Value (TLV) in/around the chamber with the help of leak gas detector.

2.2.2. Assessment of equipment & facilities

The fumigation agency shall be assessed for possessing essential equipments and accessories **(Appendix-VI)** that are required for undertaking Aluminium Phosphide treatments and their working condition, availability of a separate secured place for stocking fumigant, proper upkeep and maintenance of safety equipments (gas masks / SCBA) and calibration of measuring equipments etc.

2.2.3. Assessment of organization & personnel

The fumigation company must have an organizational chart with clear job descriptions. At minimum level, it shall have a general manager or equivalent, who shall have authority and resources to carry out assigned administrative jobs for up-keep of the office and a technical manager (fumigation operator), who shall be responsible for all fumigation technical activities.

The fumigation company must have sufficient number of technical personnel to carry out its activities. A minimum of two persons shall be required to carry out each fumigation activity including an accredited fumigation operator.

Both the management of Fumigation Company and the accredited fumigation operator must be aware of all the regulatory requirements including the licensing requirements regarding use of fumigants and the operational requirements outlined in the Aluminium Phosphide standard of the Dte of PPQS. They must be aware of their responsibilities and the need to acquaint every one associated with fumigation treatment process.

2.3. Issue of Certificate of Approval & Accreditation

Each assessed fumigation agency with accredited fumigation operator shall be issued a certificate of approval in the prescribed format (**Appendix-VII**)

Each fumigation operator after successful assessment shall be issued recognition Accreditation Certificate (**Appendix-VIII**), valid for a period of 1 (one) year initially and thereafter it can be renewed after every two year. Accredited fumigation operators are required to apply for renewal at least 45 days prior to the expiry of accreditation. On receipt of a renewal application, Dte of PPQS will conduct an assessment in line with original approval process. If the assessment is found satisfactory, renewed certificate of approved registration / accreditation will be issued.

2.4. Audit Protocols

Dte. of PPQS shall establish an audit system outlined below to measure the performance of Fumigation Company and the accredited fumigation operator against the requirements of the Aluminium Phosphide standard of the Dte of PPQS. The audit will be carried out by the specified officers of the Dte of PPQS as per the checklist in **Appendix-IX**. At the end of each audit, the auditor shall list out non-conformities under the following three categories:

- **Critical non-conformity**: occurs when as a result of collection and analysis of objective evidence it is concluded that the fumigation agency has grossly violated the regulatory requirements and the requirements of the Aluminium Phosphide standard established by the Dte of PPQS and the Accreditation Scheme.
- **Major non-conformity**: A deviation or multiple deviations from the documented procedures that is confirmed through the collection of objective evidence that shows discrepancies or lapses in discipline relating directly to either the Standard and/or regulatory requirements and which may compromise the overall effectiveness of the Accreditation Scheme.

Note: - Two MAJOR non-conformities equal to one CRITICAL non-conformity .

- **Minor non-conformity:** A deviation from the documented procedures that is confirmed through the collection of objective evidence that shows minor discrepancies or lapses in discipline relating to the Standard that do not compromise the overall effectiveness of the Accreditation Scheme.

Note: -Two MINOR non-conformities equal to one MAJOR non-conformity.

The critical non-conformities will result in immediate suspension of the fumigation company and the accredited fumigation operator from the Accreditation Scheme. Major and minor non-conformities will result in corrective actions and an additional announced audit.

Dte of PPQS will notify the fumigation company and the accredited fumigation operator in writing within 7 working days of the nonconformity and advise the fumigation company and the accredited fumigation operator of subsequent compliance action to be taken by the said fumigation company. The fumigation company shall submit a corrective action report in the format prescribed in **Appendix-X** to the Dte of PPQS, with records and details non-conformities, corrective action and the proposed date for rectification.

Type of Audits:

2.4.1. Initial Audit

An initial audit of a company will take place for first time registration of company/agency along with fumigation operator assessed as being technically competent. Initial audit will be repeated until the fumigation company with accredited fumigation operator demonstrate technical competency in fulfilling the requirements of the standard and Accreditation Scheme for 1st registration. There after initial audit shall be replaced by annual audits and random checks.

2.4.2. Announced audit

Dte of PPQS will undertake announced audit at least once in every 12 months period. Two nominated officers of Dte of PPQS, with prior intimation, will undertake the audit on a mutually convenient date arranged with Fumigation Company and their accredited fumigation operators.

2.4.3. Un-announced audit / surprise check

Dte of PPQS may undertake an un-announced audit / surprise check at least once in every 12 months or at any time on public complaint without any prior intimation to the fumigation agency and its accredited fumigation operators to assess the competency and compliance of the standard**.** The findings of such Un-announced audit / surprise check shall be submitted to PPA in format as per **Appendix-XV**.

2.4.4. Re-instatement audit

Dte of PPQS will undertake reinstatement audit following a period of suspension for non-compliance by the agency. Reinstatement audit will be conducted at a convenient date arranged with fumigation agency and its accredited fumigation operators.

2.5. Suspension and Reinstatement Protocol

Dte of PPQS may immediately suspend fumigation agency and accredited fumigation operators that perform ineffective fumigation operations. The suspended fumigation company and the accredited fumigation operators will be served a show cause notice as to why they should not be removed from the Accreditation Scheme. Such agency will be subject to reinstatement audit if they want to continue the fumigation activities.

If during an audit, one or more critical non-conformities, two or more than two major non-conformities, four or more than four minor non-conformities, are found, fumigation company and its accredited fumigation operator will be suspended immediately and will be subject to a reinstatement audit, if they want to continue the fumigation activities.

If during an audit, less than two major and less than four minor non-conformities are found the fumigation company and the accredited fumigation operator will be subject to an additional announced audit within six (6) weeks. If during the follow-up audit, it is observed that the said non-conformities have not been addressed, the fumigation agency and the accredited fumigation operator will be suspended immediately and will be subject to a reinstatement audit within six (6) weeks. Reinstatement audit will be repeated if required until the fumigation agency and the accredited fumigation operator demonstrate competency in fulfilling the requirements of the Aluminium Phosphide Standard.

The approval granted to the fumigation agency and the recognition granted to the fumigation operator will be cancelled, if:

- on a reinstatement audit, a critical or two major non-conformities have accrued or
- they are suspended on three separate occasions within a period of ten years.
- the receipt of non-compliance notification from importing countries on the ground of detection of live pests will be treated as sufficient ground for immediate suspension of fumigation agency concerned.

Once an accreditation has been cancelled, before re-accreditation can take place, the accredited fumigation operators will be required to undertake additional accreditation training. Thereafter the fumigation company and the accredited fumigation operator will be required to complete assessment process a fresh.

2.6. Appeal and Revision Protocol

If the fumigation company and the accredited fumigation operator believe that there were extenuating circumstances in respect to the occurrence of non-conformity, the fumigation agency and the accredited fumigation operator may appeal against the decision of PPA. Compliance action will remain in place, while the appeal is being considered.

For this purpose, the fumigation agency and the accredited fumigation operator shall apply a memorandum of appeal against the decision to the Joint Secretary, in-charge of Plant Protection Division, Department of Agriculture & Cooperation, Krishi Bhavan, New Delhi-110001, within seven working days of the communication of decision. The memorandum of appeal should clearly set out the grounds for appeal. Joint Secretary, in-charge of Plant Protection Division, shall acknowledge the receipt of the appeal within 5 working days and endeavour to make a decision on the appeal in writing within 30 working days of the receipt of all available facts relating to the matter.

Joint Secretary (Plant Protection) may call for all the records relating to the decision from the Plant Protection Adviser for the purpose of satisfying himself to the legality or propriety of any such decision passed by the PPA before any such order as deemed fit shall be passed.

However, before any such order is passed, PPA shall be given a reasonable opportunity to be heard and no such order shall be passed after expiry of 30 working days.

2.7. Documents/Records of Fumigation

The fumigation agency must ensure that a standard operational procedure is documented in line with the provisions of the Aluminium Phosphide standard of the Dte of PPQS. The fumigation agency must ensure that the following records and documents relating to supervision, monitoring and testing of compliance with the procedures are maintained in prescribed format and kept up to date.

- Stock and Issues Register for fumigant (ALP) (**Appendix-XI**)
- Calibration records
- Fumigants Stock Register
- Record of Servicing of Equipments & Replacement of Accesssories
- Test Report of sheet permeability provided by the manufacturer
- Personal Health Records of Fumigation Operators & Co-workers
- Record of Accredited Fumigation Operators
- Fumigation Certificates (**Appendix-XII**)
- Monthly Record of ALP use by the agency **(Appendix – XIII)**

2.8. Reporting of Fumigation Activities

The fumigation agency must report to the Dte of PPQS by 5th day of the month regarding the stock / use of Aluminium Phosphide fumigant and the details of all the fumigation operations carried out in the previous month as per format in **Appendix-XIV**.

2.09 Schedule of Treatment with ALP

The 'Recommended usage' of fumigant is given below. This includes commodities, pest organisms, dosage, permissible concentration in air, aeration/waiting period and maximum number of fumigation suggested. However, if there is specific stipulation by the importing country in respect of above parameters, the same is to be adopted.

Common Name : Aluminium Phosphide (ALP) generating Phosphine gas, PH_3)

Composition : (a) Active ingredients: Aluminium Phosphide 56% w/w/ minimum.

(b) Other ingredients: Ammonium salts, wax, fillers and adjuvants 44% w/w maximum

(c) A 3 gm tablet generates 1 gm PH_3 alongwith NH_3 and CO_2

2.10 Important consideration in Treatment

(i) Do not recirculate, follow normal diffusion. Not recommended for vacuum fumigation.
(ii) In order to ensure 100% mortality of all the stages of insects a 10 day exposure would be necessary especially in bulk grain treatment.
(iii) In order to generate PH_3 from tablets free moisture is required. Hence, too dry grain should not be fumigated with PH_3 tablets.

2.11 Best Effective Use of Alp:

- At relative humidity of over 75% maximum release of PH_3 occurs in 45 hrs. at 25^0C.
- For bag stacks a minimum of 7 days exposure at a dosage of 6 tablets per tone at 25^0C gives best kill of insects;
- Perfect gas-tight conditions give desired results; gas loss could be unmanageable at temperature exceeding 25^0C.
- Only trained fumigation operator knowing toxicological properties and having technological skill should use the Alp.

2.12 Constraints in Use of Alp:

- Fumigation should not be attempted at Relative Humidity (RH) less than 50% (grain moisture contents around 10%)
- Some insect species are highly tolerant toPH_3 especially at low temperatures and short exposures.
- Oil bearing commodities tend to air slowly and have to be checked for residual PH3.
- Odour threshold is 2 ppm; unfavorable on long exposure.
- Flammability hazard.
- Brass and copper are attacked.

2.13 Detectors for Alp:

- Paper strip detectors sensitive to 0.3 ppm.
- Detector tubes sensitive to 0.01 mg PH_3.

3. Doses of Fumigant (ALP) and Precaution to be taken

3.1 Recommended Usage:

Fumigant	Conditions of use	Pest / Organism	Dosage			Permissible Concentration In air (ppm)	Aeration/ Waiting period (days)	Maximum number of repeated fumigation suggested
			Application	Weight/volume	Exposure Period			
1	2	3	4	5	6	7	8	9
Aluminium Phosphide	(i) stored whole cereals and seed grains, millets,	S.o. T.c. R.r. T.g. O.s. C.cau	Air tight (cover or godowns)	3 tablets (3gms. each per tonne of commodity	Minimum 5 days (S.O.7 days t.g.14 days)	Threshold limit value of 0.3 ppm or 0.004 mg/litre	One hour of partial aeration in case of non-polyethylene packed	As and when required. Residue level not to exceed

	pulses, dry fruits, nuts, and spices	C.ch. C.cep.				of air (0.4 mg/ m^3	commodities followed by 6-8 hours of full aeration. For Polyethylene packed commodities minimum aeration period is 48 hours. The waiting period for the release of stocks is 48 hours in both the cases. General recommended aeration for bag stock – 15 days	0.05 ppm.
	(ii) Milled products: deoiled cakes, rice, bran, flour, suji, meals & crushed grain (Animal & poultry food) split pulses (Dals) and other processed foods	T.c. O.s. C.cep. C.cau. L.o. T.p. C.k.	Airtight (cover or godowns)	3 tablets/tonne or 225 gm / 100m^3	5 days	Threshold limit value of 0.3 ppm or 0.004 mg/litre of air (0.4 mg /m^3)	Aeration as waiting period 7 days, to be checked with PH_3 detector strips	As and when required. Residue level not to exceed 0.01 ppm
	(iii) Empty godowns and sheds	All insect pests	Under airtight conditions	14 tablets/1000 cft. Or 150gm/100 m^3	72 hours	Threshold limit value of 0.3 ppm or 0.004 mg/litre of air (0.4 mg /m^3	Aeration period 24 hours Detector strips or Phosphine detector tubes should be used in the premises to signal safety of atmosphere	As and when required
	(iv) Burrows	Rodents M.p M.b T.i. M.m. B.b. G.c. R.r		1-2 pellets of 0.6 gm Alp/burrow	24 hours	-		As and when required

3.2 Precautions for operators: (including type of detectors/canister required to be used)

- Do not inhale Aluminium Phosphide dust and Phosphine gas.
- Do not open Alp containers with any sharp metallic device as contents may catch fire due to friction.
- Protective clothing like hand gloves and special respirator with reaction type canister must be worn during fumigation with aeration.
- Do not work alone in any fumigation work.
- Odour of the fumigant should not be relied upon as an indication of poisonous concentration of the fumigant.
- Phosphine detector strips or tubes be used before allowing workers entry into the fumigated premises.
- Smoking or eating at any time during fumigation should be strictly prohibited.
- Persons with punctured ear drums must not be employed for fumigation work.
- Although most formulations are designed to delay liberation of PH_3 from Aluminium Phosphide tablets, they liberate highly toxic Phosphine gas on opening the container. The gas is liberated on exposure to air. All fumigation work should, therefore, be planned so that operation of placing the tablets, covering with fumigation covers and closing doors and ventilators should be completed within shortest possible time but not more than 30 minutes.

- To ensure uniform and speedy placement / distribution of tablets, the points of application should be decided in advance.
- Warning notices must be pasted at the fumigation site to prevent exposure of employees/public to the gas.
- Phosphine reacts with metals especially with copper or copper containing equipments. So all copper containing equipment and parts in the godowns or other structures should be protected before the start of fumigation.

- Always open the containers in open air.

- Tins or tubes once opened which have to be stored for a short period must be sealed tightly and kept away from children and pets.

- In order to have proper distribution of PH3 gas, 2/3rd of the Aluminium Phosphide tablets should be placed/distributed on the upper half of the stack.

3.3 Medical aid:

Symptoms of poisoning:

Phosphine is highly toxic to human beings. The gas is not absorbed through the skin. There is no evidence of cumulative effects from intermittent, low level exposure of 10 ppm or less. At higher concentration, inhalation of Phosphine may produce symptoms including nausea, vomiting, diarrhea, headache, chest pain and massive accumulation of fluids in the lungs before death.

Treatment : The treatment is only symptomatic and supportive.

If Phosphine has been inhaled, immediate hospitalization and observation for 72 hours for delayed onset of severe pulmonary oedema is advisable.

Obtain chest X-ray, examine for infiltrates and perform analysis of arterial blood gases. Maintain PO_2 above 60 mg. Hg by instituting in stepwise fashion, the following measures are needed;

- Administration of 60 to 100 percent oxygen by mask or cannula;
- Intubation and mechanical ventilation, and
- Positive and expiratory breathing. Fluid balance must be maintained; use of diuretic may be required. Steroids may be administered for two to four days to decrease the inflammatory response of the lung.
- Treat central nervous system effects symptomatically.

4. Major Stored Product Pests

Common Name	Scientific Name	Abbreviation used in text
Rice Weevil	*Sitophilus oryzae (L)*	S.o.
Lesser grain borer	*Rhizopertha dominica (F)*	R.d.
Khapra beetle	*Trogoderma granarium Everts.*	T.g.
Rust red flour beetle	*Tribolium castaneum (Herbst)*	T.c.
Saw-toothed grain beetle	*Oryzaephilus surinamensis*	O.s.
Cadelle beetle	*Tenebroides mauritanicus (L)*	T.m.
Drug Store beetle	*Stegobium paniceum (L)*	S.p.
Cigarette beetle	*Lasioderma serricorne (F)*	L.s.
Pulse beetle	*Callosobruchus chinensis Fabr.*	C.ch.
Long-headed flour beetle	*Latheticus oryzae (Waterhouse)*	L.o.
Coffee berry borer	*Araecerous fascilutatus*	A.f.
Dried-fruit beetle	*Carpophylus hemipterous*	C.h.
Red legged ham beetle	*Necrobia rufipes (De.G.)*	N.r.
Flat grain beetle	*Cryptolestes praillus (Schon)*	C.p.
Carpet beetle	*Attagenous piceous*	A.p.
Rice moth	*Corcyra cephalonica (Staint.)*	C.ceph.
Almond moth	*Ephestia (Cadra) cautella (Walk)*	C.cau.
Mites	*Tyrophagus puterescentiae (Sch)*	T.p.
	Caloglyphus kremeri (Ber)	C.k.
Fruit fly	*Dacus ferrugineus (Fab.)*	D.fer.
	D.zonatus (Saund)	D.zon.
	D.cucurbitae (Coq)	D.cuc.
	Carpomyia versuviana	C.ves.

4.1 MAJOR RODENT SPECIES

Common Name	Scientific Name	Abbreviation used in text
Lesser bandicoot rat	*Bandicota bengalensis*	B.b.
Indian Desert Gerbil	*Meriones hurrianae*	M.h.
The brown spiny mouse	*Mus platythirx*	M.p.
House mouse	*Mus musculus*	M.m
Sewer rat	*Rattus norvegicus*	R.n.
House rat	*Rattus rattus*	R.r.
Soft furred field rat	*Rattus meltada*	R.m.
Indian Gerbill	*Tatera indica*	T.i.
Large bandicoot rat	*Bandicota indica*	B.i.
Little field mouse	*Mus booduga*	M.b.

***

Appendix-I

Directorate of Plant Protection, Quarantine & Storage, Faridabad-121001.

Register of Fumigation Agencies with Accredited Fumigation Operators

Registration Number	Date of Issue	Valid up-to	Revalid up-to	Name of the Fumigation Agency/Branch & Address	Name of Accredited Fumigation Operator	Accreditation Number	Date of issue	Valid Up to	Revalid Up to	Other Identification Number/ Marks, if any	Remarks & Sign of Registrar

APPENDIX –II

APPLICATION FOR APPROVAL OF FUMIGATION AGENCY OR ORGANIZATION FOR STOCK/USE OF ALUMINIUM PHOSPHIDE

To,
The Plant Protection Adviser
Directorate of Plant Protection, Quarantine & Storage,
N.H.IV, Faridabad
Haryana – 121001.

FOR OFFICE USE
Registration No.: Date:

Sir,

I/We on behalf of the following firm apply for granting approval for stock/use of Aluminium phosphide Control Operations within the State/U.T./Specified port in accordance with the provisions of Rules and Regulations issued under Insecticides Act, 1968. The particulars furnished as under: -

1. Name of the Firm/branch with complete Postal Address : _____

_____

_____

2. Registration/License No. & Date (Commercial) If any. : _____

_____

3. Area of Operation : _____

4. Head office particulars of the firm & address : _____

5. Brief Account of the Activities of the firm : _____

_____

_____

6. Details of Technical Personnel employed by the firm :

A. Supervisory Staff :

B. Operational Staff :

7. List of Fumigation/Safety:
Equipments & accessories
available with the firm

8. Additional information, if any : _____

_____

_____

9. DECLARATION

(i) I/We declare that the information given above is true to my/our knowledge and belief and no part thereof is false / concealed.
(ii) I/We abide by the provisions of relevant regulations under the Insecticides Act, 1968 and rules notified there under.
(iii) I/We also abide by the Compliance agreement/undertaking executed herewith.

Place :

Date :

_____
Signature of Branch Manager/
Head of the Office

(Office Seal)

ANNEXURE TO APPLICATION (APPENDIX – II)

ANNEXURE 1 – List of Recognised Supervisory Staff

SL No.	Name	Date of Employment	Dte. of PPQ&S recognition certificate No. & date (if any).
1. 2 3.			

ANNEXURE 2 – List of Operational Staff

SL No.	Name	Date of Employment	Educational Qualifications	Training in General Pest Control Operations	Remarks
1. 2 3. 4. 5.					

ANNEXURE 3 – List of Equipment/Accessories (Attach List as per format)

SL No.	Name of the Equipment/ Accessories	Make	Specifications including ISI, If any	No. of units available with firm	Date of purchase/procurement

APPENDIX –III

APPLICATION FOR RECOGNITION OF FUMIGATION OPERATOR

To,
The Plant Protection Adviser
Directorate of Plant Protection, Quarantine & Storage,
N.H.IV, Faridabad
Haryana – 121001.

FOR OFFICE USE
Registration No.: Date:

Sir,

I hereby apply for issue of a certificate of recognition of my expertise for undertaking fumigation operations with Aluminium Phosphide at the premises of the firm described herewith. The particulars furnished as under: -

1. Name of the Applicant : _____

2. Age and Date of Birth : _____

3. Name and Address of firm: _____

   _____

   _____

4. Address of place where Firm is / to be established : _____

   _____

   _____

5. (i) Educational Qualifications (documentary proof to be attached)

Degree	Subjects	University	Year of Passing

(ii) Training in Fumigation (documentary proof to be attached)

Name of the Institute	Period of training	Particulars of certificate issued

Appendix-X

Corrective Action Report	
Name of Fumigation Company/Branch:	**Location:**

Details of Nonconformity	Corrective Action to be taken	Proposed date for rectification

Name & Signature of Authorized Signatory of Company with Date	

Date :

Place :

APPENDIX – XI

STOCK/ISSUE REGISTER FOR FUMIGANT (ALP)/PESTICIDES

S. No	Date of Entry	Opening Stock of fumigant	Quantity Of fumigant Purchased	Particulars of Invoice/ LR/Bill No & Dt/stock Transfer No. date	Total Stock of fumigant	Quantity of fumigant used /transferred	Closing balance	Signature of Authorised Signatory/ Head of Office
1	2	3	4	5	6	7	8	9

Appendix- XII

Fumigation Certificate

(Company letter head) **(Dte PPQS Regd No. _____ dated_____)**	**Treatment Certificate Number** **Date of Issue**
This is to certify that the goods described below were treated in accordance with the fumigation treatment requirements of importing country (_____) and declared that the consignment has been verified free of impervious surfaces/layers such as plastic wrapping or laminated plastic films, lacquered or painted surfaces, aluminium foil, tarred or waxed paper etc. that may adversely effect the penetration of the fumigant, prior to fumigation	
Details of Treatment	
Name of Fumigant	
Date of fumigation	
Place of fumigation	
Dosage of Fumigant	
Duration of Fumigation (in days)	
Average ambient humidity during fumigation (%)	
Fumigation performed under gastight sheets	**Yes/No**
Description of Goods	
Container Number (or numerical link)./Seal Number	
Name & Address of exporter	
Name & Address of consignee	
Type and description of cargo	
Quantity (MTs)/ No of packages/No of pieces	
Description of packaging material	
Shipping mark or brand	
Name & Signature of Accredited Fumigation Operator with seal & date/ Accreditation Number	
Endorsed by Specified Officer of Dte of PPQS **Name ,Signature & office seal**	

APPENDIX – XIII

MONTHLY REPORT OF STOCK/USE OF ALP

A. ALUMINIMUM PHOSPHIDE

Month	Opening Stock	Quantity purchased	Quantity used	Closing Stock	Approximate quantity of commodity fumigated
1	2	3	4	5	6

Appendix-XIV

Reporting of Stock and Use of Aluminium Phosphide to Dte. of PPQ&S

Name of Fumigation Company/Branch: (DPPQS Regd. No._____dated_____)	Month of Reporting:

Opening stock (Kg)	Qty purchased during month (Kg)	Total Qty (Kg)	Qty used (Kg)	Closing Balance (Kg)

Particulars of Fumigations carried out

IMPORTS				EXPORTS			
Commodity	Origin	Qty of commodity	Qty. of ALP used	Commodity	Exported To	Quantity of Commodity	Qty. of ALP used
Total				Total			

Name & Signature of Accredited Fumigation Operator with date _____	Name & Signature of GM/BM of Fumigation Agency with date _____

APPENDIX – XV

FORMAT OF SURPRISE CHECK OF ACCREDITATED FUMIGATION AGENCY

1. Name and address of Fumigation agency inspected :

2. Date & time of surprise inspection :

3. Surprise check carried out by :

4. Stock position of ALP/MB on date with the firm (as physically verified) :

5. Discrepancies, if any noted in the Maintenance of stock records (as revealed from checking of invoices & utilization of fumigants records :

6. Whether the firm possess valid Certificate of approval/permission for use of ALP/MB issued by the Dte. of Plant Protection, Quarantine & Storage, Faridabad (DPPQS) If so, the date of its expiry? :

7. Whether technical expertise recognized By the Directorate is on pay roll of the Firm on date :

8. Whether the fumigation/safety Equipment possessed by the firm are In working condition :

9. Whether the firm is submitting regular monthly returns on stock/use of ALP to DPPQ&S, if not give reason (should be supported by documentary evidences) :

10. Whether the firm possesses separate Place for storage of fumigants. :

11. Action taken by the firm on non-compliances /interceptions reported by importing countries During the last one year

12. Date of last surprise visit and discrepancies, if any noticed and action taken by the firm :

13. Remarks and recommendations of officers:

APPENDIX – XVI

APPLICATION FOR SUPERVISION OF FUMIGATION OPERATIONS BY PLANT QUARANTINE AUTHORITIES

To,
The Officer-In Charge
Plant Quarantine and Fumigation Station,

For Office Use by PQ Station
Registration No.
Date of Receipt
of application

1. Name and Address of party (Importer/Exporter/or his Agent) :

2. P.Q. Ref. No. & Date :

3. Commodity :

4. Quantity (Wt. in MT./Vol.cum) :

5. Name of fumigation agency Undertaking fumigation :

6. Place of fumigation :

7. Date and time of fumigation :

8. Particulars of container Nos. or Vessel name, if any, (If container /ship fumigation involved) :

9. Date of proposed shipment :

DECLARATION/UNDERTAKING

I/We declare that the information furnished above is true to the best of my/our knowledge.

I/We hereby undertake to pay the necessary fees towards supervision of fumigation operations.

I/We abide by all the instructions and procedures required by Plant Quarantine authorities in planning/set-up/conduct of fumigation.

Place :

Date : _____

Name & Signature of Importer/Exporter/or his agent

APPENDIX-XVII

Payment particulars for supervising Fumigation Operation by PQ Officers

---

1. Received a sum of Rs._____ (Rupees _____

_____) vide DD/T.R.5 No._____dated _____

From M/s. _____ towards charges for supervising fumigation operation.

(Signature of Cahier/A.O_____)

APPENDIX-XVIII

Quarantine Order for Supervising Fumigation Operation by PQ Officer

---

Permitted to undertake fumigation of _____
(commodity/container/ship)
lying at _____ through the above named approved
(place/site/godown)
fumigation agency under the supervision of _____

_____ on _____
(Name & designation of supervising Officer) (date/time)

as per the schedule of treatment described below:

Chemical _____; Dosage _____gm/cum; Duration_____

Temp_____under NAP/Vacuum (_____)in fumigation chamber/

gas-proof covers/containers/ship.

Name, Designation & Signature of Officers

APPENDIX-XIX

COMMENTS OF SUPERVISING OFFICER

1. Fumigation attended on _____ at _____

(Name &Signature)

2. Degassing attended on _____ at _____

(Name&Signature)

3. Fumigant concentration after degassing on _____ at _____

(Name&Signature)