SRI LANKA STANDARD 973 : PART 1 : 1992

UDC 632 . 934 . 2

CODE OF PRACTICE FOR FUMIGATION OF AGRICULTURAL PRODUCE

PART 1– GENERAL SAFETY REQUIREMENTS

SRI LANKA STANDARDS INSTITUTION

CODE OF PRACTICE FOR FUMIGATION OF AGRICULTURAL PRODUCE

PART 1 : GENERAL SAFETY REQUIREMENTS

SLS 973 : Part 1 : 1992

Gr. 7

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD

CODE OF PRACTICE FOR FUMIGATION OF AGRICULTURAL PRODUCE

PART 1 : GENERAL SAFETY REQUIREMENTS

FOREWORD

This standard was finalized by the Sectoral Committee on Cereals, Pulses and their products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1992-12-17.

Fumigants are toxic and chemically reactive material. Thus, considerable care is required in handling and application of fumigants to assure the safety of personnel exposed to them. This Part of the standard outlines the general principles for safe and economical use of fumigants.

This standard is issued in several parts to cover selection, safety and application techniques for commonly used fumigants.

This standard should be used in conjunction with specific codes of instructions or regulations applicable to a particular fumigation under consideration.

In some cases, fumigants drastically affect the odour and flavour of the material being fumigated. Such material should not be exposed to those fumigants.

In the preparation of this code, the valuable assistance derived from the following publications is gratefully acknowledged :

AS 2476 : 1981 Australian Standard General fumigation procedures.
MONRO, H.A.U, Manual of fumigation for insect control, 2nd ed., published by FAO, Rome, 1969.

1 SCOPE

This standard recommends general principles to be adopted to ensure safety when fumigation is carried out.

2 DEFINITIONS

For the purpose of this code the following definitions shall apply:

2.1 **fumigant** : A volatile chemical which, at a particular temperature and pressure, can exist in the gaseous state or disperse vapour in sufficient concentration for sufficient time to be lethal to pest organisms.
This excludes aerosols (smokes/fogs/mists).

2.2 **fumigation** : Application of a fumigant to a fumigation enclosure for eradication of pests.

2.3 **fumigation enclosure** : Any space which has been or intended to be made sufficiently gas tight to contain the fumigant.

2.4 **risk area** : Area surrounding the fumigation enclosure into which the fumigant may escape in concentrations hazardous to man, including at least any area less than six meters from the nearest boundary of fumigation enclosure, unless it is separated from the fumigation enclosure by a yard, street or other open space not less than three meters wide.

2.5 **authorized fumigator** : Licensed person to carry out fumigation or where no licensing arrangements exist, a qualified and experienced person who is in charge of fumigation.

3 SAFETY EQUIPMENT

3.1 Full face canister type respirator

3.1.1 Each operator should be supplied with a respirator approved by a recognized authority with the correct canister for the fumigant/mixture of fumigants used.

3.1.2 Each operator should be well instructed on the proper use and care of the respirator and the canister. The fumigator in charge should be responsible for its care and maintenance.

3.1.3 Following should be ensured each time the respirator is used:

a) Correct canister is used;
b) Facepiece has a correct fit;
This could be checked by closing the inlet to the canister with the palm and inhaling deeply; the facepiece should adhere to the face at least 15 seconds.
c) Shelf life of the canister or the recommended usage time has not expired. (see Appendix A).

3.2 Self contained breathing apparatus

3.2.1 When there is a possibility of exposure to fumigant-filled area or oxygen deficient area, a self contained breathing unit or apparatus approved by a recognized authority should be worn.

3.2.2 Under such circumstances, full face canister type respirators should not be used.

3.3 Protective clothing

3.3.1 All operators should wear protective clothing buttoned at wrist and throat when releasing the fumigant. Impervious gloves and footwear impermeable to relevant fumigant under the conditions of use should be worn where necessary.

3.3.2 Cotton ear plugs smeared with oil may be used to prevent fumigant vapours penetrating through ears.

3.3.3 Eye protection should be provided, where appropriate.

3.4 Safety harness and ropes

When a fumigator is required to enter a basement or the hold of a ship or other such area for applying fumigant or for rescue purposes, he shall wear a safety harness to which a rope is attached by which he can be hauled up.

3.5 Detection equipment

Correct detection equipment for the fumigant used should be available on every fumigation and should be kept in efficient working order. Infra red gas analysers are required for immediate detection of dangerous concentrations of the fumigant in the working environment.

3.6 Torch

Torches safe for use in an atmosphere made flammable by the fumigant should be available on every fumigation.

4 FIRST AID INSTRUCTIONS

4.1 All fumigators/operators should be trained in basic first aid with emphasis on artificial respiration and gas poisoning.

4.2 All authorized fumigators should possess the Material Safety Data Sheet (MSDS) of the fumigant used, supplied by the manufacturer. The fumigator incharge or a responsible person should be familiar with the information provided in the MSDS and should follow instructions accordingly.

4.3 Fumigators / operators should carry with them, or have access to, an adequately provisioned first aid kit with pertinent information on the nature of poisoning and suggestions for remedies.

4.4 A medical kit for treatment of cyanide poisoning should be available when hydrogen cyanide is used as the fumigant.

4.5 If antidotes are recommended as first aid measure for any poison used, it should be kept in the first aid kit with required accessories like sterile needles,disposable syringers etc. and information on the dosage of antidote required and the frequency of treatment.

4.6 Adequate protective equipment should be used when entering the contaminated area for rescue purposes. When an accident happens, succumbed person(s) should be removed to fresh air, laid down in a restful position and kept warm.

4.7 First aid treatment should be started immediately. Calling for a doctor/ambulance should be done at once. While awaiting the arrival of medical aid, the following should be carried out:

a) Apply artificial resucitation and external cardiac massage, if required.
b) Loosen all tight clothing.
c) Remove contaminated clothing including wrist watch and spectacles.
d) Thoroughly wash contaminated skin with clean water.
e) If there is an eye contamination, hold eyelids open, immediately flush continuously with a gentle flow of clean water until doctor arrives. Do not use any chemicals.

4.8 Regular medical examinations of the personnel engaged in fumigation should be carried out to check the general health. Affected personnel should be kept away from fumigation temporarily or permanently.

4.9 Fumigators/operators should not suffer from colour blindness and/or ear drum perforations.

5 ACTION BEFORE FUMIGATION

5.1 Notification of authorities and persons concerned

5.1.1 A fumigator intending to fumigate a building or other enclosed space outside the premises of an approved fumigation firm should notify every occupier within the fumigation enclosure and risk area 24 hours prior to the commencement of fumigation.

5.1.2 A fumigator intending to fumigate a vessel should deliver a notice prior to the commencement of fumigation to

a) the appropriate Port Authority;
b) the appropriate police station and fire brigade; and
c) the person in charge of the vessel who must acknowledge the receipt by signing the duplicate copy which shall be retained by the fumigator.

5.2 Warning signs

The fumigator should affix to each door or other means of access to the fumigation enclosure, a notice (see Appendix B), before the commencement of fumigation .

The words "DANGER KEEP OUT" and "FUMIGATION BY (Name of fumigant)"should appear in capital letters not less than 100 mm high in contrasting colour to a white background.

The warning notices should be suitably illuminated.

5.3 Precautions

The fumigator should ensure the following before the commencement of fumigation.

a) All parts of the fumigation enclosure and risk area have been vacated.
b) All fires, pilot lights and heaters within the fumigation enclosure have been extinguished.
c) No matches and cigarette lighters are present in the risk area when the fumigant used is flammable. Smoking should be prohibited.
d) All liquids and foods not required to be fumigated have been removed from the fumigation enclosure.
e) Fumigation enclosure have been sealed to prevent the escape of fumigant.
f) Fans and switches within fumigation enclosure are functioning efficiently.
g) Nearest telephone has been located and number noted.
h) Sufficient amount of water is available.

6 FUMIGATION

6.1 Specific instructions for the use of a particular fumigant should be studied in detail giving due consideration to the volume of fumigation enclosure, goods to be fumigated, pest to be controlled and duration of fumigation.

6.2 The concentration of the fumigant should not be grossly different from the recommended concentration under any circumstance.

6.3 Any person should not work alone in any fumigation irrespective of the extent of work or dosage.

6.4 Every person engaged in fumigation should be instructed of the use of protective equipment and first aid measures specific to the fumigant used.

6.5 Openings to facilitate ventilation should be provided with temporary seals that can be removed from the outside of the fumigation enclosure at the completion of fumigation.

6.6 Fans should be operated intermittently to allow for desorption of the fumigant. No reduction in the normal ventilation period should be made even when the fans run continuously.

6.7 Taking food, drinks and smoking should be prohibited during work and should not be done until the hands are washed thoroughly after work.

6.8 Correct dosage of the fumigant should be applied to the fumigation enclosure in accordance with specific instructions and safety measures. Fumigant should be introduced from the outside of fumigation enclosure wherever possible. It should be applied in such a way that goods or structures do not absorb it in liquid form.

6.9 Whenever a safety harness is required to be worn, at least one person should remain in the immediate vicinity and in clear sight of the operator. Adequate provision should be made to haul out the operator in an emergency.

6.10 Any person who enters the risk area or fumigation enclosure should wear a respirator or other approved breathing apparatus until the area is free from danger.

6.11 During and after fumigation, the fumigator (wearing a respirator) should inspect using appropriate detection apparatus for leaks in equipment and in fumigation enclosure. Any leaks detected should be sealed and re-tested ensuring that the fumigation enclosure is gas tight. In case of a massive accidental release of fumigant, evacuate the risk area immediately.

6.12 Where the fumigation enclosure and risk area cannot be satisfactorily secured by locking, a watchman should be on duty. It is recommended that a watchman should be present during the exposure period even on locked premises.

7 ACTION AFTER FUMIGATION

7.1 At the end of the fumigation period, the fumigant should be removed by controlled release into the atmosphere ensuring the following :

a) risk area is free from unauthorized persons.
b) fumigation team is properly equipped as in 3 and 4.
c) ventilation of the fumigation enclosure is done by mechanical means; If mechanical ventilation is not available the enclosure should be unsealed in sections allowing gradual release of the fumigant;
When natural ventilation is insufficient for rapid clearing of the gas, fans should be utilized, but operators should leave the risk area for at least 30 minutes immediately after switching on the fans.

7.2 After a sufficient period of ventilation, properly equipped operators should check the concentration of fumigant in the risk area; If it is acceptably low, should proceed to check the fumigation enclosure.
If the fumigant concentration is excessively high (as guided by the recommended threshold limit values), further period of time should be allowed to pass and recommence the check procedure until all sections of the fumigation enclosure is proved safe for re-entry.

7.3 Upon completion of the fumigant removal as given in 7.1, a clearance declaration (see Appendix B), should be issued.

7.4 Operators should re-enter to remove fumigation equipment only when the fumigant concentration in the risk area and fumigation enclosure have fallen to a safe working level.

7.5 Every person in charge of a fumigation should keep a record of the fumigation including the following details :

a) Address of the fumigation enclosure;
b) Fumigant used;
c) Fumigation commencing time;
d) Fumigation clearance time; and
e) Copies of all notices submitted.

These information should be provided for examination by appropriate authorities on demand.

7.6 Spent reaction products and empty containers should be disposed carefully ensuring safety.

7.7 Any accident with or without injury to persons and medical findings should be recorded and should be reported to relevant authorities.

APPENDIX A
USE AND CARE OF RESPIRATOR CANISTER

A.1 Canisters should be stored in a cool, dry and well-ventilated place away from contamination by any fumigant.

A.2 Canisters should be replaced before its shelf life has expired or the recommended usage time has been reached.

A.3 When a canister is attached to a respirator after the top seal is removed, the date should be recorded by affixing a small adhesive label on which the date is marked. This label can be used as a 'log' to record exposure of the canister to the fumigant.

A.4 The cap and the seal over the air inlet valve of the canister should be removed before using the respirator. The date should be marked on the 'log' label at this time. Once this seal is removed, even if there is no exposure of fumigant, the canister should be replaced after a lapse of 6 months.

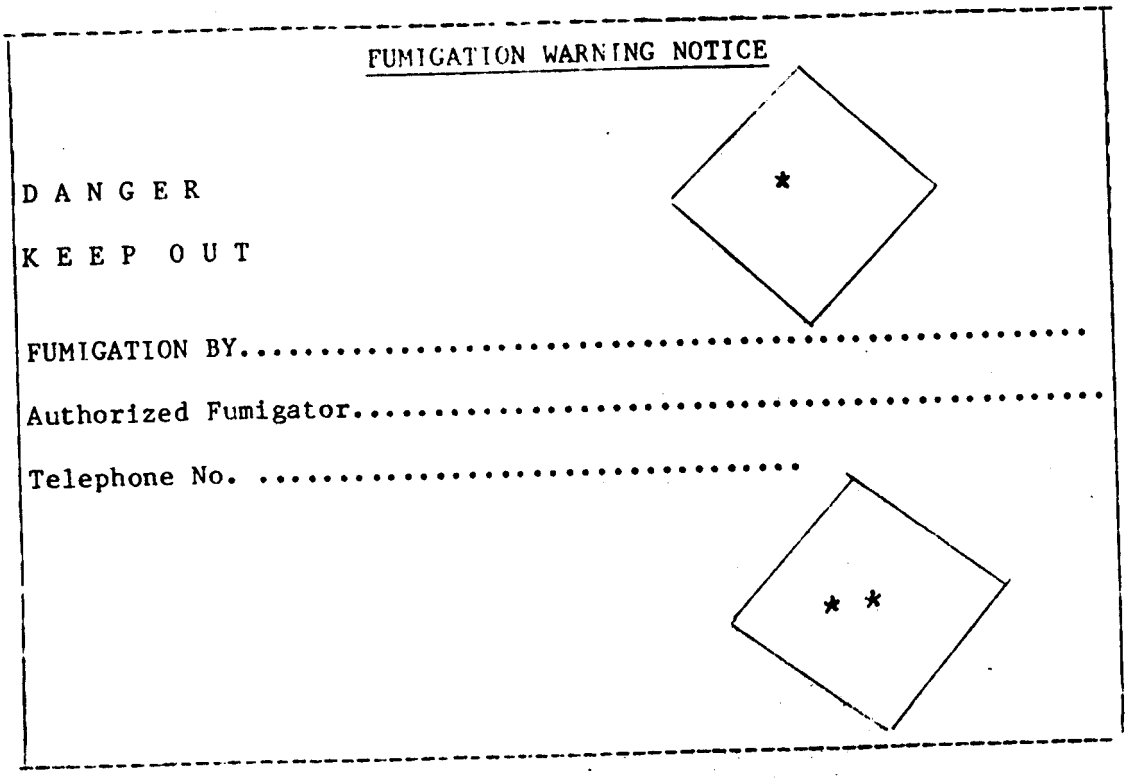
A.5 The canister should be immediately discarded after any fumigation in which there has been prolonged exposure to low concentrations or accidental exposure to high concentrations of the fumigant.
As a guide, one hour of wearing is the usual period after which the canister should be discarded. This could be extended to 2 hours only when exposure is minimal. A wide margin of safety should be allowed in estimating exposure times as canisters cost little in terms of health of the individual. If there is any doubt about the exposure life of the canister, it should be discarded.

A.6 Discarded canisters should be rendered unusable by mutilating the inlet port and disposed of under conditions which will prevent them from being picked up and used again.

A.7 Canisters that show any sign of external damage should be discarded. A severe blow on the metal covering may cause displacement of the contents, permitting contaminated air to pass through to the wearer.

A.8 Immersion of the canister in water renders it useless. Water may enter the canister through the facepiece. Disconnect the hose and canister when cleaning or disinfecting the facepiece.

APPENDIX B



B.1 Warning signs to be affixed on the entrances to the fumigation enclosure

* *Poison gas symbol - Skull and cross bones marked in black on a white background.*

** *Flammable gas symbol - flame, marked in black on a red background. (affix if applicable)*

CLEARANCE DECLARATION

Declaration of safety following fumigation.

To.....

Please take note that ..(Name or number and location.....

...of fumigation enclosure).....

fumigated on .....(date)..... is now safe for re-entry.

....

Date Signature of the authorized fumigator

B.2 Notice to be issued after removal of the fumigant

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.