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Agricultural machine operator enclosures — Air filtration —

Part 1:

Definitions, test methods, requirements and information to be provided to the operator

Enceintes pour opérateurs de machines agricoles — Filtration de l'air —

Partie 1: Définitions, méthodes d'essai, exigences et informations à fournir à l'opérateur

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 17954-1 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests*.

ISO 17954 consists of the following parts, under the general title *Agricultural machine operator enclosures - Air filtration*:

- Part 1: *Definitions, test methods, requirements and information to be provided to the operator*
- Part 2: *Pesticide vapour filters - testing procedure and performance criteria for agricultural operator enclosures*

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Introduction

The application of agricultural operator enclosures in airborne distributed pesticides environment continues to grow. For this reason, it is important that agricultural operator enclosures provide the necessary protection of the operator during pesticide application. Personal protection equipment (PPE) can provide the protection but it would be preferred to have the tractor provide the protection for the comfort of the operator. This standard establishes both the performance criteria and the associated test procedures for evaluation of the operator enclosure performance. This standard allows OEM (Original Equipment Manufacturers) suppliers or "will fit" manufacturers to verify that an installed operator enclosure meets the intent of the standard criteria. This allows an operator enclosure unit to be verified after it had been used in service or after completion of mechanical service.

This standard is based on two parts as follows:

Part 1: Agricultural machine operator enclosures - Air filtration - Definitions, test methods and information to be provided to the operator

Part 2: Agricultural machine operator enclosures – Pesticide vapour filters - testing procedure and performance criteria for agricultural operator enclosures

This Standard provides definitions, performance criteria and test procedures for operator enclosures used on agricultural tractors and self-propelled machines to replace or supplement specified personal protection equipment required when the machines operate in an environment where agricultural pesticides are present.

Annex A is included to identify references used in the development of this Standard. It is informative and not considered part of this Standard.

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Agricultural machine operator enclosures — Air filtration — Part 1: Definitions, test methods, requirements and information to be provided to the operator

1 Scope

The scope of this international standard is limited to terminology, definitions, performance criteria, test criteria and information to be provided to the operator on agricultural operator enclosures on machines used in applying or exposed to agricultural pesticides excluding fumigants. The purpose is to provide protection inside the operator enclosure equivalent to that of personal protective equipment (PPE) specified in the use instructions on the pesticide label, thus eliminating the need to wear PPE respirators when inside the operator enclosure. This standard provides uniform means to meet the varying regional filtering requirements.

2 Normative reference(s)

The following standards contain provisions, which, through reference in this text, constitute provisions 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 should apply the most recent editions of the standards indicated below. Standards organizations maintain registers of currently valid standards.

ISO 5353:1995, Earth moving machinery - Seat index point

ISO 14269 - Part 4:1998, Tractors and self-propelled machinery for agriculture and forestry - Operator enclosure environment - Part 4: Air filter element test method

ISO 14269 - Part 5:1998, Tractors and self-propelled machinery for agriculture and forestry - Operator enclosure environment - Part 5: Pressurization system test method

ISO 17954 - Part 2:200X, Agricultural operator enclosures - Environmental Air quality - Part 2: Pesticide vapour filters - testing procedure and performance criteria for pesticide filters for enclosed agricultural cabs.

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3 Term(s) and definition(s)

For the purposes of the international standard these definitions apply.

3.1

active ingredient

Any substance or group of structurally similar substances that will prevent, destroy, repel, or mitigate any pest or that functions as a plant regulator, desiccant, or defoliant.

3.2

aerodynamic diameter

The diameter of an unit density sphere that would have the same settling velocity as the particle or aerosol in question.

3.3

aerosols

Small droplets of liquid or particles of solid matter suspended in air that are fine enough in particle size, 0.01-100 µm [particle volume median diameter], to remain dispersed for a period of time.

3.4

air purifying device

A component or series of components that comprises a system that removes contaminants.

breathing point

The zone surrounding the operator's face and is located 660 mm above the SIP.

3.5

concentration

The relative content of a component in a mixture or solution.

3.6

contaminant

Unwanted airborne material which may be in the form of gases, vapours, aerosols or particulate matter.

3.7

dermal exposure

An exposure to pesticides by skin contact.

3.8

droplet

A small drop of a liquid material.

3.9

dust

Any particulate material suspendible in air formed from a finely divided solid.

3.10

efficiency

A measurement of the performance (expressed in percent) of an air purifying device removing contaminants from the air passing through the device

3.11

engineering control

An operator enclosure equipped with an air-purifying device, which protects the operator from dermal and/or respiratory pesticide exposure.

3.12

filter

An air purifying device or element used to remove particulates or vapours from the air passing through it.

3.13

fumigant

A pesticide that vapourizes readily at ambient air temperatures.

3.14

inert ingredient

Any substance other than an active ingredient which is intentionally included in a pesticide.

3.15

inhalation exposure

Exposure to pesticides through inhalation.

3.16

intake air (input)

Outside or ambient air brought into the operator enclosure.

3.17

mist

Cloud-like aggregation of liquid droplets having a diameter of $<100\ \mu\text{m}$ which are temporarily suspended in air.

3.18

operator enclosure (cab)

The part of the machine which forms a boundary between the space surrounding the operator and the outside environment and effectively eliminates free passage of air, dust, and other substances into the area around the operator.

3.19

oral exposure

Exposure to pesticides by ingestion.

3.20

particulate filter

A filter that is designed to capture particulate matter.

3.21

particulate matter

Suspended contaminants or dust which are solid at normal temperature and pressure.

3.22

personal protective equipment, PPE

Chemically resistant apparel and devices that provide dermal and inhalation protection for pesticide handlers and workers as specified in the use directions on a pesticide label.

3.23

pesticides

Any substance or mixture of substances that is registered to destroy, prevent, repel, or mitigate pests (insects, rodents, nematodes, fungi, or weeds) or that is registered to function as a plant regulator, desiccant, or defoliant. Pesticides may have a toxic or nontoxic mode of action.

3.24

pesticide exposure

External (dermal) and/or internal (inhalation and/or oral) contact of the human body to pesticide.

3.25

pesticide label

Printed statement as required by regulations or agency policies affixed to the pesticide container by the manufacturer listing the quantity of active and inert ingredients, directions for use and precautions.

3.26

PPE storage

Space for storage of PPE in an appropriate closed container.

3.27

pressurization

The pressure differential between the static pressure inside and outside of the operator enclosure (ISO 14269- Part 5)

3.28

pressurization system

All components used to pressurize the operator enclosure, and that influence the performance of the system, such as blowers, filters, duct work, and heat exchangers.

3.29

recirculated air

The air from within the operator enclosure that is recirculated per unit of time, expressed in m³/hr.

3.30

recirculating filter

Filter used for filtering the air that is recirculated within the operator enclosure.

3.31

recirculation system

A provision to recycle interior air within an operator enclosure through the heat exchanger and/or air purifying device.

3.32

reduction factor

The ratio between particulate concentrations outside and inside the operator enclosure, based on measuring the concentration of particles (classified by aerodynamic diameter). May also be referred to as protection factor.

3.33

seat index point, SIP

Reference point relative to the operator's seat as determined by a SIP measurement device (ISO 5353).

3.34

vapour

The gaseous form of any substance which is a liquid or solid at normal temperature and pressure

3.35

vapour filter

A filter that is capable of substituting for the vapour removing canister specified on the pesticide label.

4 Operator enclosure classification

4.1 basic cab, BC

An operator enclosure that does not have a nonporous physical barrier totally surrounding the operator to provide protection from pesticides.

4.2 enclosed cab for pesticide application incorporating dermal protection, ECPAD

An operator enclosure that substitutes for PPE specified as a requirement on the pesticide label, when the label does not require a respirator with vapour removing canister or cartridge. Provides dermal and contact hazard protection by a required nonporous physical barrier totally surrounding the operator to prevent contact with spray, vapour, dust, or treated foliage and is equivalent to that provided by the PPE equipment specified on the pesticide label or instructions.

4.3 enclosed cab for pesticide application incorporating respiratory protection, ECPAR

An operator enclosure that includes a particulate and, if specified by the pesticide label, vapour adsorptive filter element primary filter or air purifying device. Cab has the additional provision of providing protection equivalent to that required by a respiratory protection device equipped with vapour removing canister or cartridge as specified as part of PPE on the pesticide label or instruction. Includes the capabilities of a ECPAD.

Table 1 Reference Summary for Operator Enclosure Classification

	Dermal Protection	Vapour, Dust and Mist Protection	Fumigant Protection
BC	NO	NO	NO
ECPAD	YES	NO	NO
ECPAR	YES	YES	NO

5 Requirements for air purifying device ECPAD/ECPAR

5.1 Identification

Filters designed for ECPAD/ECPAR application shall be clearly and indelibly marked with the following information.

5.1.1 Name, trademark or other identification mark of the manufacturer or supplier;

5.1.2 Classification of filter Vapour, particulate (Class A – 5.2.3.1 or Class B – 5.2.3.2) or vapour and particulate (Class A or B).

5.1.3 Hours of usage until replacement or one season, whichever occurs first shall be provided with the filter.