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Crop protection equipment — Drift classification of spraying equipment —

Part 3:
Potential spray drift measurement for field crop sprayers by the use of a test bench

Matériel de protection des cultures — Classification de la dérive des matériels de pulvérisation —

Partie 3: Mesurage de la dérive potentielle de pulvérisation des pulvérisateurs à rampes par banc d'essai

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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 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22369-3 was prepared by Technical Committee ISO/TC 23, *Tractor and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*.

ISO 22369 consists of the following parts, under the general title *Crop protection equipment — Drift classification of spraying equipment*:

— *Part 1: Classes*

— *Part 2: Classification of field crop sprayers by field measurements*

— *Part 3: Potential spray drift measurement for field crop sprayers by the use of a test bench*

Introduction

In recent years, spray drift control has become more and more relevant and the prevention from drift risks has been mainly based on the introduction of buffer zones.

Determination of buffer zones widths or other regulations take into account the type of spraying equipment used for pesticide application and its sensitivity to drift.

ISO 22369-1 defines the spray drift reduction classes. The other parts of ISO 22369 specify the test procedures; therefore, ISO 22369-1 is intended to be used in combination with one of the other parts of ISO 22369.

This part of ISO 22369 is aimed at defining the test procedures to assess potential drift generated by field crop sprayers employed on arable crops, using an ad hoc test bench, in order to get a quick and simple description of this spraying equipment according to their properties to create or reduce drift.

The potential drift-reducing performance of the spraying equipment is rated against a reference sprayer configuration.

The objective of the ISO 22369 series is to provide uniform procedures for the determination of the drift-reducing performance of spraying equipment.

Crop protection equipment — Drift classification of spraying equipment —

Part 3:
Potential spray drift measurement for field crop sprayers by the use of a test bench

1 Scope

This part of ISO 22369 specifies the drift classification procedure for field crop sprayers by the measurement of potential spray drift with the use of a test bench and it allows the allocation of the spray drift reduction classes specified by ISO 22369-1.

This part of ISO 22369 is applicable to mounted, trailed and self-propelled field crop sprayers used in arable crops and horizontal boom sprayers used for weed control in orchards/vineyards and for spray application on horticultural crops.

This part of ISO 22369 is intended for booms using a uniform set of spray generators and not specifically for band sprayers and sprayers with attachments designed to spray within, and directed into the canopy. It cannot be used conveniently to evaluate the effect of travel speed on drift potential or to compare spraying equipment at different speeds.

This part of ISO 22369 is applicable where comparative assessment or classification of the relative spray drift potential from spray generators (e.g. nozzles) or spray liquids is needed.

The objective of this part of ISO 22369 is to determine the potential spray drift generated by field crop sprayers through the use of a test bench and to compare the values obtained with those of a reference sprayer, defined as in Table 2 of ISO 22369-2:2010, in order to rate (classify) the field crop sprayers.

The application of this part of ISO 22369 may support advisory services for farmers, the product development and legal certification and classification schemes.

This part of ISO 22369 is intended to be used together with ISO 22369-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5681, *Equipment for crop protection — Vocabulary*

ISO 22369-1, *Crop protection equipment — Drift classification of spraying equipment — Part 1: Classes*

ISO 22369-2:2010, *Crop protection equipment — Drift classification of spraying equipment — Part 2: Classification of field crop sprayers by field measurements*

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO 5681 and the following apply.

3.1
field crop sprayer
sprayer equipped with a spray boom fitted with nozzles of the same size, to be used on arable crops

3.2
potential spray drift
percentage of initial spray that remains suspended in the air after the sprayer passage and which represents the fraction of spray liquid susceptible to drift out of the treated area by the action of air currents during the application process

3.3
reference spray deposit
RSD
intended amount of spray deposit in the treated area assuming a perfect even distribution under the boom

NOTE For example, applying a volume of 100 l/ha the reference spray deposit RSD corresponds to 1 µl/cm^2.

4 Principles

The aim of the method is to determine the potential spray drift generated by field crop sprayers, by collecting the droplet sediments after the spray boom has passed over the entire length of the test bench. The total amount of collected sediment is compared to the reference spray deposit to obtain the drift potential value (DPV); see 7.2.

Due to differences in good agricultural practices for plant protection in different regions and for different crops, the modification of the reference spraying system may be necessary. However, to allow international comparison of measurements, any classification scheme shall include data derived with the equipment as given in Table 2 of ISO 22369-2:2010.

5 Test materials and equipment

5.1 Test liquid

Clean water with no solids in suspension added with a water soluble tracer (e.g. yellow Tartrazine E102). The tracer concentration and analytical sensitivity shall be appropriate to guarantee the detection of at least 0,01 µl/cm^2 of spray on the deposit collector.

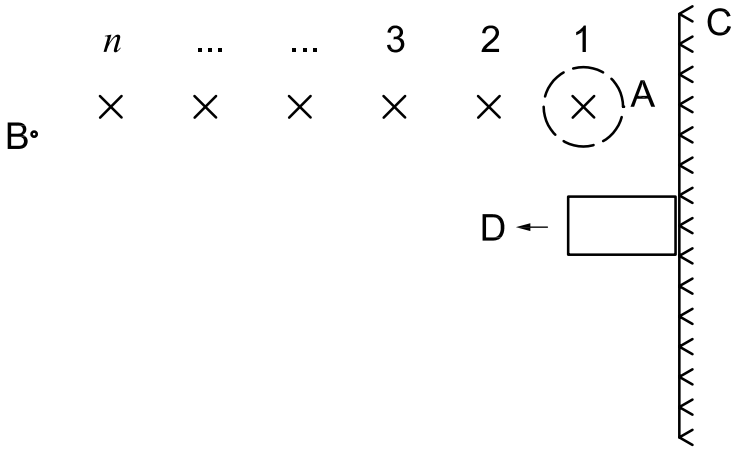
5.2 Test bench to assess potential drift

The test bench consists of a frame track provided with aligned slots where the deposit collectors (e.g. Petri dishes) are lodged and with sliding covers linked together and able to ensure the complete covering of the artificial collector slots (see Figure A.2).

Spacing between slots shall be (500 ± 2) mm. The test bench shall be equipped with at least 20 slots for deposit collectors. Number the slots from 1 to n according to the sprayer travel direction. The area of the deposit collector in each slot shall be at least 100 cm^2.

The sliding covers shall be linked to a control device enabling to cover and/or uncover the deposit collectors by the spray boom pass.

The control device enabling to uncover the deposit collectors shall be activated automatically when the spray boom passes point B (see Figure 1). Point B shall be positioned so that the deposit collectors are uncovered when the nozzle spray jets hit the ground at (2 ± 0,1) m distance beyond the middle of collector n. This should prevent the nozzles from spraying directly onto the deposit collectors.



Key

1, 2, 3, n collectors

A slot for artificial collector

B starting point for uncovering collectors positioned so that the collectors are uncovered when the nozzle spray jets hit the ground at (2 ± 0,1) m distance beyond the middle of collector n.

C boom sprayer

D travel direction

Figure 1 — Scheme of the test bench

NOTE See also Annex B for an example of a test bench.

6 Test conditions

6.1 Environmental conditions

Operate tests with an average wind velocity < 0,3 m/s and a maximum wind velocity < 0,5 m/s, with an air temperature between 5 °C and 35 °C and relative humidity between 40 % and 95 %. Wind velocity measurements shall be reported and carried out at least at 1 Hz frequency and at 2 m height. In the test report, record the environmental average temperature, the average relative humidity, the maximum, minimum and average wind velocity and the average wind direction (with respect to the test bench direction) during the test (see Annex A).

The temperature difference between soil and environment shall not be large enough to create turbulence.

Comparison tests between two spraying equipment and replications of the same test shall be carried out in similar conditions and always under the specified limits. Maximum and minimum wind velocity shall also be recorded in all tests.

6.2 Test bench positioning

Position the test bench on a flat surface with turfgrass (height of vegetation between 50 mm and 75 mm, in order to stabilize the environmental conditions), so that the deposit collectors are located at a height of (250 ± 50) mm from the ground, with the line of collectors parallel to the sprayer travel direction and aligned with the nozzle, close to the centre of the right or left half-boom (see Figure 1).

6.3 Forward speed

Measure the forward speed of the candidate and of the reference sprayer with an accuracy of at least 0,1 km/h, measuring the time needed to cover a distance of at least 50 m.