INTERNATIONAL STANDARD

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Agricultural and forestry machinery — Inspection of sprayers in use —

Part 1: General

Matériel agricole et forestier — Contrôle des pulvérisateurs en service — Partie 1: Généralités

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 16122-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 144, *Tractors and machinery for agriculture and forestry*, in collaboration with ISO Technical Committee TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 16122 consists of the following parts, under the general title *Agricultural and forestry machinery — Inspection of sprayers in use*:

— *Part 1: General*

— *Part 2: Horizontal boom sprayers*

— *Part 3: Sprayers for bush and tree crops*

— *Part 4: Fixed and semi-mobile sprayers*

Other parts are planned (see Annex A).

Introduction

There are two main reasons for the inspection:

— less potential risk of environmental contamination by plant protection products;

— good control of the pest with the minimum possible input of plant protection product.

In order to use plant protection products in agricultural production safely, it is necessary to define the requirements and test methods for sprayers in use. This is a relevant step after having standardized minimum requirements for new sprayers, in respect of safety hazards (see ISO 4254-6) and potential risks of environmental contamination (see ISO 16119 series).

Standardising the requirements and methods for inspection of sprayers in use takes into consideration not only the original performance of the sprayer but also its use, care and maintenance. This is a logical link to ensure the continued benefit arising from the supply of new sprayers of good quality.

The inspection of sprayers in use can be a mandatory requirement or adopted on a voluntary basis. In both cases further requirements, outside the scope of this standard, are necessary for the management of inspections. These include, for example, requirements for the competence of persons carrying out inspections and the frequency of inspections.

NOTE National or local regulations may also apply concerning the qualifications and competence of inspectors.

Agricultural and forestry machinery — Inspection of sprayers in use —

Part 1: General

CAUTION — Some of the tests specified in this part of ISO 16122 involve processes which could lead to a hazardous situation. Any inspector performing tests in accordance with this standard should be appropriately trained in the type of work to be carried out. National or local regulations regarding health and safety may apply.

NOTE 1 The inspector also needs to take into consideration hazards generated at the maximum working pressure of the system and to decide if the test can be performed.

1 Scope

This part of ISO 16122 defines the general requirements to be fulfilled for the inspection of all types of sprayers for plant protection products used in agriculture, horticulture, forestry and other areas, except knapsack sprayers.

NOTE 2 For knapsack sprayers, see ISO 19932–1 and ISO 19932–2.

The specific requirements for the different types of sprayers are defined in the relevant specific parts of ISO 16122. When used in conjunction with the relevant sprayer specific part (see Annex A), this part of ISO 16122 specifies the requirements and test methods for the in use inspection of sprayers. The requirements relate mainly to the condition of the sprayer with respect to potential risks for the environment and its performance to achieve a good application.

This part of ISO 16122 also includes minimum requirements for the preparation of the sprayer for the inspection and the minimum safety requirements with respect to the safety of the inspector (test operator) during the inspection.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

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

NOTE The terms and definitions for specific sprayers are given in the relevant specific parts.

4 Criteria for classification of sprayers

In order to define the application of each part of ISO 16122, a classification of sprayers has been established. See Annex A.

5 Pre-inspection requirements

5.1 General

The owner/operator of the sprayer should be present at the inspection and should ensure that known faults are remedied before the inspection.

All equipment necessary for the inspection and used by the inspector for testing the sprayer (e.g. flow meters, pressure indicators, forward speed sensors) shall be checked at regular intervals, normally at least once a year with certified equipment. Proof of calibration shall be available.

5.2 Place for inspection

The inspection shall be made at a location which avoids risks of pollution and water contamination.

The influence of external conditions on the reproducibility of the results of the inspection shall be minimized (e.g. effects of wind, rain).

NOTE National or local regulations may also apply regarding pollution and water contamination.

5.3 Pre-inspection

5.3.1 General

A preliminary inspection, according to 5.3.2 to 5.3.8, shall be carried out by the inspector to avoid:

— incidents that could result in either injury or damage to the health of the inspector;

— wasting time by making measurements on sprayers with very obvious serious faults.

5.3.2 Cleaning

The sprayer shall be clean.

Cleaning shall include internal parts, filters, filter inserts and external surfaces giving special consideration to areas of contamination to which the inspector could be exposed during the inspection.

Compliance shall be checked by inspection.

5.3.3 Power transmission parts

The power take-off (PTO) drive shaft guard and the guard of the power input connection (PIC) shall be fitted and in good condition. In addition,

— the different parts of the shaft, the universal joints and locking systems shall not show excessive wear,

— the PTO drive shaft guard shall be present and shall not show any deformations or tears, and

— in case of non-rotating guards, the restraining device that prevents the rotation of the power take off drive shaft guard shall be present and shall work properly.

Protective devices and any moving or rotating transmission parts shall not be affected in their function.

Compliance shall be checked by inspection.

5.3.4 Moving parts

All guards provided for protection of the operator shall be present and function correctly.

Where possible or when not required for the sprayer function, all access to other moving parts shall be prevented by specific safety devices to prevent any risk to the inspector.

Compliance shall be checked by inspection.

5.3.5 Pipes and hoses for hydraulic transmission

There shall be no visible leakage from the hydraulic system.

Hydraulic hoses shall not show excessive bending and abrasion through contact with surrounding surfaces. They shall be free from defects such as excessive surface wear, cuts or cracks.

Hydraulic pipes shall be retained in position and be free of significant corrosion or damage.

Compliance shall be checked by inspection.

5.3.6 Structural parts and framework

All structural parts and framework shall be in a good condition without permanent deformation, significant corrosion or other defects which could affect the rigidity or the strength of the sprayer.

This requirement applies also to the hitching device.

Compliance shall be checked by inspection.

5.3.7 Lockable foldable parts

Locking of foldable parts of the sprayer shall secure these parts in their intended positions.

Compliance shall be checked by inspection.

5.3.8 Blower

5.3.8.1 General

If provided, the blower (fan, casing, air deflectors) shall be in good condition and mounted in a functional manner. Inspection shall verify in particular that:

— blades are not missing or damaged;

— all parts are free of mechanical deformation, excessive wear, corrosion sufficient to interfere with safe operation and significant vibration;

— guarding to prevent access to the fan is present.

The blower shall work properly at the nominal working range of PTO speed, e.g. no vibrations due to imbalance, no friction between the body and the fan or wrong orientation of the blades.

Compliance shall be checked by inspection.

5.3.8.2 Clutch

If the blower can be switched off separately from other driven parts of the sprayer, the clutch shall function properly.

Compliance shall be checked by inspection.

6 Inspection

After the sprayer has passed the pre-inspection it shall be inspected in accordance with the applicable part of ISO 16122 as listed in Annex A.

7 Test report

A test report shall include the results of the pre-inspection and the sprayer specific part and shall be given to the owner/operator.

The test report shall give at least the following information:

— Test station;

— Name and contact details of the inspector and, where different, the testing organisation and signature;

— Date of inspection;

— Owner's identity;

— Owner's address;

— Sprayer manufacturer;

— Sprayer type;

— Serial number or other identification;

— Year of construction;

— Drive (i.e. Mounted/trailed /self-propelled);

— Any malfunction of the sprayer. If the malfunction is a result of sprayer design this should be noted;

— Any information on malfunctions of the sprayer useful to identify the corrective work required;

— Results of measurements.

Additional information that may be included in the test report is given in the specific parts.

NOTE National or local regulations may give additional requirements for reporting of inspections.

Annex A
(informative)

Parts of ISO 16122 dealing with specific sprayer types

Table A.1 sets out the subject of each of the other parts of ISO 16122.

Table A.1 — Parts of ISO 16122 dealing with specific sprayer types

Criteria	Part 2	Part 3	Part 4	Subject of future part of ISO 16122			
	Horizontal boom sprayers	Sprayers for bush and tree crops	Fixed and semi-mobile sprayers	Portable sprayers[a]	Foggers	Train-mounted sprayers	Aerial application platforms
Types of sprayers/ driving power							
Tractor-mounted	X	X			X		
Tractor-trailed	X	X			X		
Self-propelled	X	X			X		
Truck/all-terrain vehicle	X	X			X		
Quad-mounted	X	X			X		
Quad-trailed	X	X			X		
Aerial-mounted							X
Train-mounted						X	
Semi-mobile (stationary unit + moving part, e.g. for greenhouses)			X		X		
Human-mounted				X	X		
Human-trailed	X	X					
Animal-mounted							
Animal-trailed							
Type of outlet							
Boom horizontal	X		X	X		X	X
Boom vertical		X	X	X		X	
Boom circular		X					
Gun and lance	X	X	X	X	X		
Canon		X	X	X	X		
Droplet production							
Pneumatic	X	X	X	X			
Centrifugal	X	X	X	X			X
Hydraulic nozzle	X	X	X	X	X	X	X
Thermal			X		X		
Ultrasonic							

[a] Except knapsack sprayers (see ISO 19932).

Table A.1 *(continued)*

Criteria	Part 2	Part 3	Part 4	Subject of future part of ISO 16122			
	Horizontal boom sprayers	Sprayers for bush and tree crops	Fixed and semi-mobile sprayers	Portable sprayers[a]	Foggers	Train-mounted sprayers	Aerial application platforms
Transportation							
Non-assisted	X	X	X	X	X	X	X
Air-assisted	X	X	X	X			
Electrostatic	X	X					X
Form of application							
Liquid droplets	X	X	X	X	X	X	X
Liquid contact							
Solid							
Gas							
Injection							
Indirect	X	X	X	X	X	X	X
Direct (specific sprayer)	X	X	X			X	
Direct (additional device on conventional sprayer)	X	X	X			X	
No injection (pure liquid)	X			X			
Tunnel							
Without recycling	X	X	X				
With recycling		X	X				
Application targeting							
Full spraying	X	X	X		X	X	X
Localized without sensors (e.g. band sprayers)	X	X	X				
Targeted spraying with sensors	X	X					
Target							
Field crop and low plants (including weed control and non-agricultural applications)	X		X		X	X	X
Bush		X	X		X		X
Trees		X			X		X

[a] Except knapsack sprayers (see ISO 19932).

Bibliography

[1] ISO 4254-6, *Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors*

[2] ISO 16119 (all parts), *Agricultural and forestry machinery — Environmental requirements for sprayers*

[3] ISO 19932-1, *Equipment for crop protection — Knapsack sprayers — Part 1: Safety and environmental requirements*

[4] ISO 19932-2, *Equipment for crop protection — Knapsack sprayers — Part 2: Test methods*

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