International Standard

ISO 16122-1

Second edition
2024-12

Agricultural and forestry machinery — Inspection of sprayers in use —

Part 1: General

Matériel agricole et forestier — Contrôle des pulvérisateurs en service —

Partie 1: Généralités

Reference number
ISO 16122-1:2024(en)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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.

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 document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 16122-1:2015), which has been technically revised.

The main changes are as follows:

— removed errors and resolved contradictions to the ISO 16119 series which specifies environmental requirements for new sprayers;

— updated the normative references;

— modified pre-inspection in 5.3;

— modified inspection clause;

— modified the test report.

A list of all parts in the ISO 16122 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

There are two main reasons for the inspection of sprayers:

— reducing the 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 document 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 concerning the qualifications and competence of inspectors can apply.

Agricultural and forestry machinery — Inspection of sprayers in use —

Part 1: General

1 Scope

This document 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 For knapsack sprayers, see ISO/FDIS 19932–3:—.

The specific requirements for the different types of sprayers are defined in the relevant specific parts of the ISO 16122 series. When used in conjunction with the relevant sprayer specific part (see Annex A), this document specifies the requirements and test methods for the inspection of sprayers in use.

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 document 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 document is referred to in the text in such a way that some or all of their content constitutes requirements 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 5681:2020, *Equipment for crop protection — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5681:2020 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Criteria for classification of sprayers

In order to define the application of each part of the ISO 16122 series, 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 (for example 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 (for example effects of wind, rain).

The water used during the inspection shall be managed to prevent potential contamination of the environment.

5.3 Pre-inspection

5.3.1 General

A preliminary inspection in accordance with 5.3.2 to 5.3.9, shall be carried out by the inspector to avoid:

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

— making measurements on sprayers with obvious serious faults.

5.3.2 Cleaning

The sprayer shall be clean.

Cleaning shall include internal parts, filters, filter inserts and external surfaces giving extra attention to prevent cross-contamination and ensure effective future use to areas which the inspector can be exposed to 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 well-maintained and free from significant defects or wear that would compromise its functionality, appearance or structural integrity. In addition:

— the different parts of the shaft, the universal joints and locking systems shall not show wear and tear that goes beyond the normal of expected levels, indicating a degree of damage or deterioration that exceeds a typical usage pattern that can affect safe functionality;

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

— 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 feasible and practical under the given circumstances or when not required for the sprayer to 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 Hydraulic system

There shall be no visible leakage from the hydraulic system.

Hydraulic hoses shall not show bending and abrasion through contact with surrounding surfaces that goes beyond the normal or expected level, indicating a degree of damage or deterioration that exceeds typical usage patterns. They shall also be free from defects such as surface wear, cuts or cracks that goes beyond the normal or expected level, indicating a degree of damage or deterioration that exceeds typical usage patterns.

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 well-maintained and free from significant wear that would compromise its functionality, appearance, or structural integrity and 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 well-maintained and free from significant defects or wear that would compromise its functionality, appearance or structural integrity 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, wear and tear that goes beyond the normal or expected level, indicating a degree of damage or deterioration that exceeds typical usage patterns, corrosion sufficient to interfere with safe operation and significant vibration;

— guarding to prevent access to the fan is present and without visible damage or permanent deformation.

The blower shall work properly at the nominal working range of PTO speed, for example 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 and gearbox

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

If present, the gearbox and the shifting of the gears shall function properly.

Compliance shall be checked by inspection.

5.3.9 Electrical safety (for electrical systems on sprayers > 50 V)

All electrical cables and wiring shall be free from defects such as surface wear, cuts or cracks that goes beyond the normal or expected levels, indicating a degree of damage or deterioration that exceeds typical usage patterns and shall be provided with proper connections.

All plugs, sockets, housings, casings and controls shall be without visible damage or permanent deformation.

Compliance shall be checked by inspection.

6 Inspection

The pre-inspection shall be completed before initiating the inspection of the sprayer. For inspection of the sprayer the applicable part of the ISO 16122 series shall be used.

CAUTION — Some of the tests specified in the applicable part of the ISO 16122 series involve processes which can lead to a hazardous situation.

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

NOTE Annex A gives an overview of what types of machines that are covered by the different parts of the ISO 16122 series.

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);

— type of agitation (Hydraulic/Mechanical);

— a reference to the relevant part of the ISO 16122 series and deviations, if any;

— any malfunction of the sprayer. If the malfunction is a result of sprayer design this shall be noted;

— any information on malfunctions of the sprayer, to identify the corrective actions necessary to pass the test;

— results of measurements.

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

NOTE 1 National or local regulations giving additional requirements for reporting of inspections can apply.

NOTE 2 Acquiring personal information can be subject to local personal data protection regulations.

Annex A
(informative)

Parts of the ISO 16122 series dealing with specific sprayer types

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

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

Criteria	ISO 16122-2	ISO 16122-3	ISO 16122-4	Subject of future parts of ISO 16122			
	Horizontal boom sprayers	Sprayers for bush and tree crops	Fixed and semi-mobile sprayers	Portable sprayers[a]	Foggers	Train mounted	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, for example for greenhouses)			X				
Human- mounted				X	X		
Human -trailed	X	X					
Animal -mounted							
Animal -trailed	X	X					
Type of outlet							
Boom horizontal	X		X	X		X	X
Boom vertical		X	X	X		X	
Boom circular		X					
Gub and lance	X	X	X	X	X		
Canon		X	X	X	X		
Droplet production							
Pneumatic	X	X	X	X			
Centrifugal	X	X	X	X			
Hydraulic nozzle	X	X	X	X	X	X	X
Thermal			X		X		
Ultrasonic							

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