
**Agricultural and forestry
machinery — Environmental
requirements for sprayers —
Part 3:
Sprayers for bush and tree crops**

iTeh STANDARD PREVIEW
*Matériel agricole et forestier — Exigences environnementales pour les
pulvérisateurs —
(standards.iteh.ai)
Partie 3: Pulvérisateurs pour arbustes et arboriculture*

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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 16119-3 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).

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ISO 16119 consists of the following parts, under the general title *Agricultural and forestry machinery — Environmental requirements and testing for sprayers*:

- Part 1: General [ISO 16119-3:2013](https://standards.iteh.ai/catalog/standards/sist/3125d7e0-c0cd-44fc-9b36-5d3d6a967d70/iso-16119-3-2013)
- Part 2: Horizontal boom sprayers <https://standards.iteh.ai/catalog/standards/sist/3125d7e0-c0cd-44fc-9b36-5d3d6a967d70/iso-16119-3-2013>
- Part 3: Sprayers for bush and tree crops
- Part 4: Fixed and semi-mobile sprayers

Introduction

The requirements of this part of ISO 16119 are based on the test methods given in ISO 5682-2:1997, which were primarily developed for hydraulic sprayers. For other types of sprayers, other test methods and/or test criteria may be needed and may be the subject of future investigation/revision of this part of ISO 16119.

This document is a type C standard as stated in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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Agricultural and forestry machinery — Environmental requirements for sprayers —

Part 3: Sprayers for bush and tree crops

1 Scope

This part of ISO 16119 specifies requirements and the means for their verification for the design and performance of sprayers for bush and tree crops, as defined in 3.1, and similar crops, with regard to minimizing the potential risk of environmental contamination during use, including misuse foreseeable by the manufacturer.

It is not applicable to human-mounted sprayers for bushes or trees.

It is intended to be used with ISO 16119-1, which gives general requirements common to all the sprayer types covered by ISO 16119. When requirements of this part of ISO 16119 are different from those which are stated in ISO 16119-1, the requirements of this part of ISO 16119 take precedence over the requirements of ISO 16119-1 for machines within the scope of this part of ISO 16119. This part of ISO 16119 does not cover safety aspects (see ISO 4254-6).

This part of ISO 16119 is not applicable to sprayers manufactured before the date of its publication.

2 Normative references

[ISO 16119-3:2013](https://standards.iteh.ai/catalog/standards/sist/3125d7e0-c0cd-44fc-9b36-5d3d6a967d70/iso-16119-3-2013)

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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 4102, *Equipment for crop protection — Sprayers — Connection threading*

ISO 4254-6:2009, *Agricultural machinery — Safety — Part 6: Sprayers and liquid fertilizer distributors*

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 5681, *Equipment for crop protection — Vocabulary*

ISO 5682-1, *Equipment for crop protection — Spraying equipment — Part 1: Test methods for sprayer nozzles*

ISO 5682-2:1997, *Equipment for crop protection — Spraying equipment — Part 2: Test methods for hydraulic sprayers*

ISO 5682-3:1996, *Equipment for crop protection — Spraying equipment — Part 3: Test method for volume/hectare adjustment systems of agricultural hydraulic pressure sprayers*

ISO 9357, *Equipment for crop protection — Agricultural sprayers — Tank nominal volume and filling hole diameter*

ISO 9898:2000, *Equipment for crop protection — Test methods for air-assisted sprayers for bush and tree crops*

ISO 13440:1996, *Equipment for crop protection — Agricultural sprayers — Determination of the volume of total residual*

ISO 16119-3:2013(E)

ISO 16119-1:2013, *Agricultural and forestry machinery — Environmental requirements for sprayers — Part 1: General*

ISO 21278-1, *Equipment for crop protection — Induction hoppers — Part 1: Test methods*

ISO 21278-2, *Equipment for crop protection — Induction hoppers — Part 2: General requirements and performance limits*

ISO 22368-1, *Crop protection equipment — Test methods for the evaluation of cleaning systems — Part 1: Internal cleaning of complete sprayers*

ISO 22368-3, *Crop protection equipment — Test methods for the evaluation of cleaning systems — Part 3: Internal cleaning of tank*

3 Terms and definitions

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

3.1

sprayer for bush and tree crops

machine for spraying plant protection products on bush and tree crops such as grapes, fruits or hops (including annual plants/crops), the application being mostly directed sideways and/or upwards to the target

3.2

plant protection product container

collective name for plant protection product packaging

EXAMPLE Can, bottle, bag, sack, box.

3.3

cleaning device

device for cleaning the insides of empty plant protection product containers

Note 1 to entry: The device may be an integral part of the sprayer or an independent installation (e.g. stationary equipment).

4 List of significant hazards

[Table 1](#) specifies the significant hazards, the significant hazardous situations and significant hazardous event(s) covered by this part of ISO 16119 that have been identified by risk assessment as being relevant for this type of machine with regard to environmental contamination, and which require specific action by the designer or manufacturer to eliminate or to reduce environmental contamination.

Attention is drawn to the necessity to verify that the environmental requirements specified in both ISO 16119-1 and this part of ISO 16119 apply to each significant hazard presented by a given machine and to validate that the risk assessment is complete.

Table 1 — List of significant hazards

Hazard		Hazardous situation/ event	Clause/subclause of this part of ISO 16119
4.1	Spillages	Filling	5.1.1.2; 8
		Induction of plant protection products	5.1.1.2; 8
4.2	Contamination of the water supply	Filling	5.1.1.2
4.3	Leakages	Transport and application	5.1.1.2; 5.1.2
		Contact with crop	5.1.4
4.4	Overfilling	Filling	5.1.1.2; 5.1.1.4; 8
4.5	Dispersal of spray mixture residues or plant protection products	Drainage	5.1.1.3.1; 5.1.1.4; 8
		Cleaning and rinsing	5.1.1.1; 5.4; 5.5; 8
4.6	Accidental leakages	Accidental opening of tank outlet	5.1.1.3.2
4.7	Over-dosing	Heterogeneous mixing	5.1.1.5; 8
		Overlapping	5.1.8
		Sprayer adjustment/control	5.1.1.4; 5.1.2; 5.1.5; 5.1.6; 5.1.8; 5.2; 5.3.1; 5.6; 8
		Sprayer maintenance/service	5.1.7; 7; 8
4.8	Unintended spraying outside the target area	Unintended deposition	5.1.8; 5.3.1
		Application	5.3.2
4.9	Drift	Spraying stop control	5.1.2; 5.1.8; 5.6
4.9	Drift	Spraying	5.3.2; 5.3.3; 7; 8
4.10	Discharge of spray mixture	Intervention on the sprayer during application or service	5.1.3; 7; 8
4.11	Dripping	Spraying stop control	5.1.4

5 Requirements

5.1 General

5.1.1 Spray tank

5.1.1.1 Surfaces

The depth of roughness, R_z , (see ISO 4287) of the inner and outer walls of the tank shall be such that $R_z \leq 100 \mu\text{m}$, measured according to ISO 4288.

5.1.1.2 Filling

Filling devices shall be designed to avoid any return of liquid from the tank to the filling supply.

The filling hole diameter shall comply with ISO 9357. The opening lid shall seal sufficiently to prevent leakage/spillage when closed.

The total tank volume shall be at least 5 % more than its nominal volume, to prevent spillage as a result of overfilling. Tanks with a nominal volume greater than 200 l shall have a nominal volume which is a multiple of 100 l.

Strainers shall have a minimum depth, d , as given in Table 2 and measured according to Figure 1.

Strainers shall be installed in filling openings and shall have a mesh size less than 2 mm. Any gaps between the tank filling hole and the strainer shall not exceed 2 mm (see Figure 1).

The filling capacity of the tank with strainer when filled with water shall be at least 100 l/min for tanks with a nominal volume of 100 l or more. For tanks with a nominal volume of less than 100 l, it shall be possible to fill the tank within 1 min.

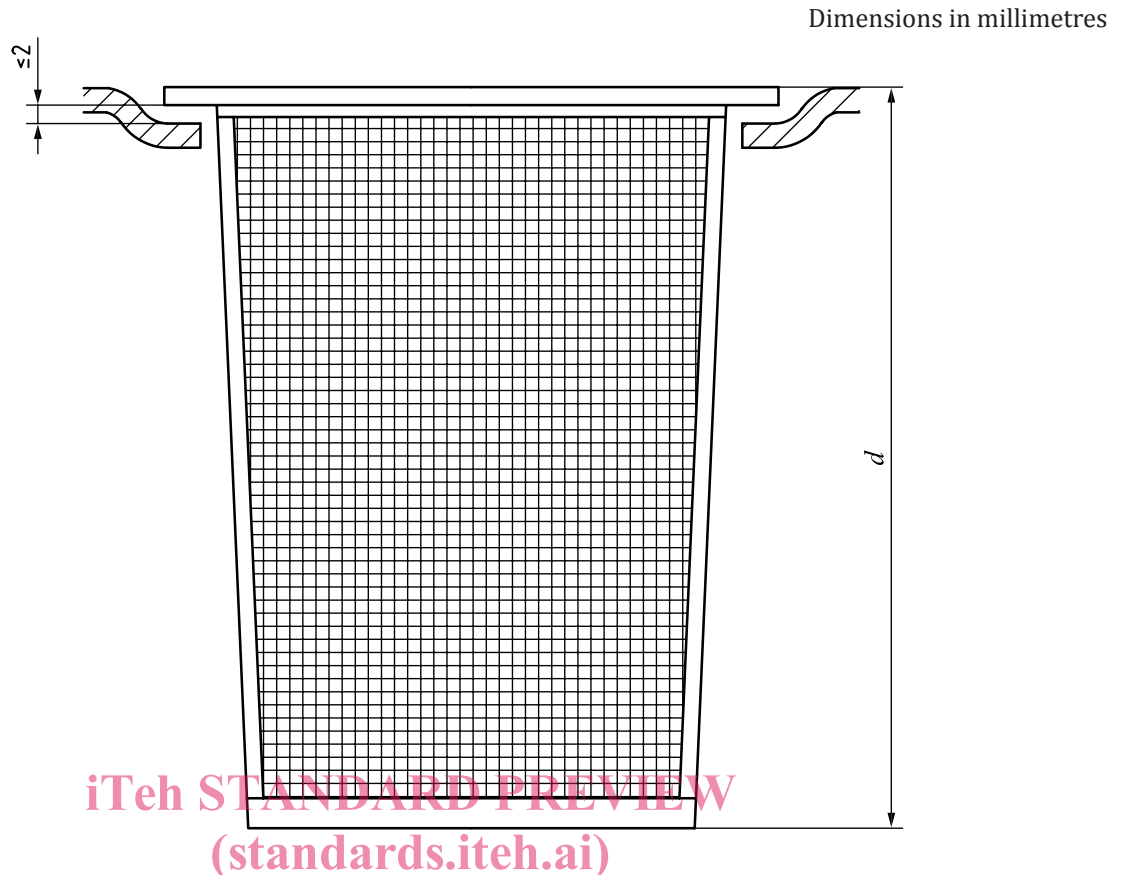
Induction hoppers shall comply with ISO 21278-2.

Table 2 — Minimum depth of strainers

Nominal tank capacity	Minimum depth ^a
C	d
l	mm
$C \leq 150$	60
$150 < C \leq 400$	100
$400 < C \leq 600$	150
$C > 600$	250

^a Measured from the upper edge of the strainer down to its bottom.

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**Key***d* minimum depth

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<https://standards.iteh.ai/catalog/standards/sist/3125d7e0-c0cd-44fc-9b36-3d50da07d704/iso-16119-3-2013>**Figure 1 — Determination of the depth of the strainer and width of gap(s)****5.1.1.3 Emptying****5.1.1.3.1 Residual volume**

The volume of total residual as defined in ISO 13440:1996, 2.1 shall not exceed

- 4 % of the nominal tank volume for a tank volume of less than 400 l;
- 3 % of the nominal tank volume for a tank volume of between 400 l (included) and 1 000 l (included);
- 2 % of the nominal tank volume for a tank volume of more than 1 000 l.

The volume of total residual shall be determined in accordance with ISO 13440.

5.1.1.3.2 Tank emptying device

An emptying device in accordance with ISO 4254-6:2009, 5.4.3 shall allow the complete emptying of the residual in the tank when the sprayer is in a horizontal position. Complete emptying of the residual is considered to have been achieved when there are no visible puddles at the bottom of the tank after 5 min drainage.

It shall be possible to collect the liquid at the outlet without contaminating the environment or equipment parts, e.g. stays.

The tank outlet shall be guarded against accidental opening.