



**International
Standard**

ISO 28139

**Equipment for crop protection —
Knapsack combustion engine-
driven airblast sprayers — Safety
and environmental requirements
and test methods**

AMENDMENT 1

*Matériel de protection des cultures — Atomiseurs portés à dos
motorisés — Exigences de sécurité et environnementales et
méthodes d'essai*

AMENDEMENT 1

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Equipment for crop protection — Knapsack combustion engine-driven airblast sprayers — Safety and environmental requirements and test methods

AMENDMENT 1

Introduction

Replace the second paragraph with the following.

This document is a type-C standard as stated in ISO 12100:2010.

Normative references

Replace Clause 2 with the following:

The following documents are 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 3767-5:2016, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 5: Symbols for manual portable forestry machines*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 5681:2020, *Equipment for crop protection — Vocabulary*

ISO 9357:1990, *Equipment for crop protection — Agricultural sprayers — Tank nominal volume and filling hole diameter*

ISO 11684:2023, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14982:1998, *Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria*

ISO 19732:2007, *Equipment for crop protection — Sprayer filters — Colour coding for identification*

ISO 19932-1:2013, *Equipment for crop protection — Knapsack sprayers — Part 1: Safety and environmental requirements*

ISO 19932-2:2013, *Equipment for crop protection — Knapsack sprayers — Part 2: Test methods*

ISO 22867:2021, *Forestry and gardening machinery — Vibration test code for portable hand-held machines with internal combustion engine — Vibration at the handles*

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ISO 22868:2021, *Forestry and gardening machinery — Noise test code for portable hand-held machines with internal combustion engine — Engineering method (Grade 2 accuracy)*

IEC 61032:1997, *Protection of persons and equipment by enclosures — Probes for verification*

Terms and definitions

Replace the first paragraph with the following.

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 5681:2020, ISO 19932-1:2013 and the following apply.

4.1

Replace the first paragraph with the following.

The machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document. (See Annex A for a list of significant hazards and hazardous situations and Annex D for a functional representation of the machine.)

4.2

Replace the last sentence with the following:

Compliance shall be checked by measurement as described in ISO 19932-2:2013, 5.3.4.

4.4

Replace the fourth paragraph with the following:

The air tube shall not be detachable without the use of a tool. This requirement does not apply to machines where detached air tube does not allow the moving elements to be reached in accordance with ISO 13857:2019, Table 4.

4.7

Replace the second paragraph with the following:

For openings, such as in covers and guards preventing access to dangerous parts, the safety distances shall be in accordance with ISO 13857:2019, Table 4.

4.11.2

Replace the first sentence with the following:

Vibration shall be measured in accordance with ISO 22867:2021 using so far as appropriate the measurement conditions specified by Annex E.

4.12.2

Replace the clause with the following:

The equivalent A-weighted emission sound pressure level at the operator's position and the A-weighted sound power level shall be measured using the measurement conditions specified by ISO 22868:2021, Annex E and reported.

See ISO 22868:2021, Clause 9 for guidance on declaration and verification.

4.13.2

Replace the clause with the following:

Electromagnetic immunity shall be verified by testing in accordance with ISO 14982:1998.

5.1

Replace the clause with the following:

The sprayer shall comply with the following requirements. The sprayer shall also comply with the requirements of 4.1, except 4.1.2 and 4.1.5, of ISO 19932-1:2013. The sprayer shall also comply with ISO 19932-2:2013 as specified in the following clauses.

The sprayer shall be designed such that the operator shall be able to pick it up, carry it and put it down with the tanks filled at nominal volume in accordance with the instruction handbook and without any spillage.

The sprayer shall be designed such that the filled sprayer can be carried in the upright position.

It shall not be possible to displace any gasket or seal from its seated position by tightening.

Compliance shall be checked by functional test.

5.2

Replace the last sentence with the following:

Compliance shall be tested according to ISO 19932-2:2013, 5.3.8.

5.3

Replace the clause with the following:

The spray tank shall have a volumetric content gauge scale.

Compliance shall be checked by inspection.

The nominal volume shall be specified in whole litres (l). It shall be possible to determine the spray tank filling level of the sprayer with a minimum resolution of 1 l. If the nominal volume of the sprayer is at least 10 l, a lower resolution is accepted for a filling level below 4 l.

Compliance shall be checked by inspection.

The volumetric contents gauge scale shall have a maximum error of ± 10 % of the reading.

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Compliance shall be tested according to ISO 19932-2:2013, 5.3.5.

It shall be possible to fill the spray tank to its nominal volume within 60 s. The total volume of all liquid spillage during filling shall not exceed 5 ml.

Compliance shall be tested according to 6.7 and ISO 19932-2:2013, 5.3.6.

In order to avoid chemical spillage during filling, the diameter of the filling opening shall be in accordance with ISO 9357:1990, Table 1.

Compliance shall be checked by inspection and measurement.

The filling tank opening shall be fitted with a lid, which shall

- be able to be opened and closed without the use of a special tool, and
- be fitted with a holding device ensuring a closed position by means of a positive mechanical action (e.g. lids fixed by screw action).

Compliance shall be checked by functional test.

It shall be possible to empty the tank of the sprayer without the need to invert the sprayer.

Compliance shall be checked by functional test.

The amount of liquid remaining in the spray tank shall not exceed 50 g when tested in accordance with ISO 19932-2:2013, 5.3.7.

Drainage opening shall not be directed towards the operator.

Compliance shall be checked by inspection.

The emptying device shall be guarded against unintentional opening.

Compliance shall be checked by inspection and functional test.

The emptying device shall be able to be operated without the use of tools when wearing appropriate protective gloves.

Compliance shall be checked by functional test.

The spray tanks shall have an additional volume of at least 5 % of the nominal volume.

Compliance shall be tested in accordance with 6.6.

5.4

Replace the sixth paragraph with the following:

Filters for the spray liquid shall be marked in such a way that they can be identified. Identification can be achieved directly or from information given in the instruction handbook, for example, by marking of filters with:

- the mesh width; or
- colour coding according to ISO 19732:2007.

5.6 and 5.7

Move the following paragraph from 5.6 to 5.7:

The fan inlet shall be designed such that the ingestion of foreign materials is avoided when the sprayer is on the ground.

6.1.4

Replace indent a) with the following:

- a) 50 kg with a maximum error of ± 100 g;

6.1.9

Replace the subclause with the following:

Filling device (for an example, see ISO 19932-2:2013, 4.6).

6.1.14

Replace the subclause with the following:

Strap test device, see ISO 19932-2:2013, 4.4.

6.7

Replace the clause with the following:

This test shall be carried out on a complete, empty sprayer using the test procedure specified in ISO 19932-2:2013, 5.3.6.

Remove the lid while keeping the strainer in position.

Position a filling device (6.1.9) with its outlet placed (100 ± 5) mm above the filling opening. Position the sprayer with its straps opposite the filling device and with the line connecting the upper strap fixing points oriented perpendicularly to the axis of the filling device (see ISO 19932-2:2013, Annex E). The impact point of the test liquid shall be the centre of the filling opening.

Pour a volume of test liquid equal to the nominal spray tank volume from the filling device into the filling opening of the sprayer.

Determine the volume of the splash liquid according ISO 19932-2:2013, 5.3.6.

7.1.1

Replace letter “d”, point “14” with the following:

14) values for equivalent A-weighted emission sound pressure level at the operator position, determined in accordance with 4.12.2, together with the uncertainty of stated values;