International Standard

ISO 19932-2

Third edition
2025-06

Equipment for crop protection — Knapsack sprayers —

Part 2: Test methods

Matériel de protection des cultures — Pulvérisateurs à dos — Partie 2: Méthodes d'essai

Reference number
ISO 19932-2:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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 ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Test liquids and equipment ... **1**
5 General ... **2**
5.1 Test conditions ... 2
5.2 Sprayer ... 2
5.3 Functional tests ... 3
5.3.1 Spray liquid shut-off device reliability ... 3
5.3.2 Spray liquid output ... 3
5.3.3 Load carrying straps and their fixation points ... 3
5.3.4 Stability ... 3
5.3.5 Contents gauge scale and total volume ... 3
5.3.6 Filling rate ... 4
5.3.7 Emptying ... 4
5.3.8 Absorbency of harness ... 5
5.4 Pressure test ... 5
5.5 Leakage test ... 5
5.6 Centre of gravity ... 6
6 Specific tests for lever-operated knapsack sprayers ... **7**
6.1 Preconditioning ... 7
6.2 Volume of the external surface deposit ... 7
6.3 Volume of total residual liquid ... 8
6.4 Drop test ... 8
7 Specific tests for engine- or motor-driven knapsack sprayers ... **9**
7.1 Volume of external surface deposit ... 9
7.2 Volume of total residual liquid ... 9
8 Specific tests for compression sprayers ... **10**
8.1 Volume test ... 10
8.1.1 Volume of external surface deposit ... 10
8.1.2 Volume of total residual liquid ... 10
8.2 Drop test ... 10
9 Test report ... **11**
Annex A (informative) **Example of a preconditioning device** ... **12**
Annex B (informative) **Example of a spray liquid shut-off test device** ... **13**
Annex C (informative) **Example of a strap test device** ... **14**
Annex D (informative) **Example of drop test device** ... **15**
Annex E (informative) **Example of filling device** ... **17**
Annex F (informative) **Example of test report** ... **18**

© ISO 2025 – All rights reserved

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 third edition cancels and replaces the second edition (ISO 19932-2:2013), which has been technically revised.

The main changes are as follows:

— the scope has been changed to include sprayers with a nominal volume of more than 6 l in order to address sprayers in professional use only;

— the test methods have been aligned with the modified requirements of ISO 19932-1.

A list of all parts in the ISO 19932 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.

© ISO 2025 – All rights reserved

Introduction

The application of plant protection products with knapsack sprayers should take into consideration biological, economic, environmental and operator issues.

The aim of this document is to specify test methods for the verification of requirements for equipment to ensure safe use and protect the environment.

Implementation of ISO 19932-1:2025 and ISO 19932-2:2025 will achieve an appropriate level of operator safety and avoid unnecessary dispersal of plant protection products into the environment.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

© ISO 2025 – All rights reserved

Equipment for crop protection — Knapsack sprayers —

Part 2: Test methods

1 Scope

This document specifies particular test methods for the verification of requirements of ISO 19932-1:2025 for knapsack sprayers carried on the back or shoulder of the operator for use with plant protection products.

It is applicable to lever-operated knapsack sprayers, knapsack compression sprayers and knapsack sprayers driven by an engine or electric motor using hydraulic pressure atomization of the spray liquid intended to be used primarily in agriculture, forestry and horticulture with a nominal volume of more than 6,0 l.

It does not apply to knapsack combustion engine-driven air-blast sprayers covered by ISO 28139:2019+2019A1:2024.

This document is intended to be applied in conjunction with ISO 19932-1:2025.

2 Normative references

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

ISO 19932-1:2025, *Equipment for crop protection — Knapsack sprayers — Part 1: Safety and environmental requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5681:2020 and ISO 19932-1:2025 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 Test liquids and equipment

4.1 **Water**, clean and free from solids.

4.2 **Preconditioning device**, allowing holding of the sprayer and the operation of the lever-operated knapsack sprayer pump lever continuously. The stroke and frequency shall be adjustable. An example is given in Annex A.

4.3 **Shut-off device test equipment**, consisting of a frame to fix the hand-held part of the shut-off device and a unit for moving the shut-off device control, e.g. valve lever, to open it periodically with an induced flow at the prescribed rate and pressure. The stroke shall be adjustable. An example is given in Annex B.

© ISO 2025 – All rights reserved