

SVENSK STANDARD

SS-EN ISO 19932-2:2013



Fastställt/Approved: 2013-06-10
Publicerad/Published: 2013-06-1G
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 14.210; 65.060.40

Lantbruk – Växtskyddsutrustning – Ryggburna sprutor – Del 2: Provningsmetoder (ISO 19932-2:2013)

Equipment for crop protection – Knapsack sprayers – Part 2: Test methods (ISO 19932-2:2013)



Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN ISO 19932-2:2013 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 19932-2:2013.

Denna standard ersätter SS-ISO 19932-2:2006, utgåva 1.

The European Standard EN ISO 19932-2:2013 has the status of a Swedish Standard. This document contains the official version of EN ISO 19932-2:2013.

This standard supersedes the Swedish Standard SS-ISO 19932-2:2006, edition 1.

**Förhållandet till övriga delar under samma huvudtitel - Utdrag ur Förord i ISO 19932-2:2013/
Relations to other parts under the same general title - Extract from the Foreword of
ISO 19932-2:2013**

ISO 19932 consists of the following parts, under the general title *Equipment for crop protection — Knapsack sprayers*:

- *Part 1: Safety and environmental requirements*
- *Part 2: Test methods*

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Lantbrukssprutor, SIS/TK 224.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 19932-2

June 2013

ICS 65.060.40

English Version

Equipment for crop protection - Knapsack sprayers - Part 2: Test methods (ISO 19932-2:2013)

Matériel de protection des cultures - Pulvérisateurs à dos -
Partie 2: Méthodes d'essai (ISO 19932-2:2013)

Pflanzenschutzgeräte - Tragbare Geräte - Teil 2:
Prüfverfahren (ISO 19932-2:2013)

This European Standard was approved by CEN on 8 May 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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.....	2
5.4 Pressure test.....	5
5.5 Leakage test.....	6
5.6 Centre of gravity.....	6
6 Specific tests for lever-operated knapsack sprayers	7
6.1 Preconditioning.....	7
6.2 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
8.2 Drop test.....	11
9 Test report	11
Annex A (informative) Example of a preconditioning device	12
Annex B (informative) Example of a 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	16
Annex F (normative) Minimum content of test report	17
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC on machinery and Directive 2009/127/EC amending Directive 2006/42/EC with regard to machinery for pesticide application.....&	

Foreword

This document (EN ISO 19932-2:2013) has been prepared by Technical Committee ISO/TC 23 "Tractors and machinery for agriculture and forestry" in collaboration with Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 19932-2:2013 has been approved by CEN as EN ISO 19932-2:2013 without any modification.

Introduction

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

The aim of this part of ISO 19932 is to specify test methods for the verification of requirements for equipment to ensure safe use and protect the environment.

Implementation of parts 1 and 2 of ISO 19932 should achieve an appropriate level of operator safety and avoid unnecessary dispersal of plant protection products into the environment.

Equipment for crop protection — Knapsack sprayers —

Part 2: Test methods

1 Scope

This part of ISO 19932 specifies test methods for the verification of requirements of ISO 19932-1 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, with a nominal volume of more than 3 l for their intended use primarily in agriculture and horticulture.

It does not apply to knapsack mistblowers covered by ISO 28139.

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 5681:1992, *Equipment for crop protection — Vocabulary*

ISO 19932-1:2013, *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 and ISO 19932-1 apply.

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](#).

4.4 Strap test device, capable of dropping the sprayer, vertically guided, onto each strap from a height of 200 mm using a horizontal restraining bar that is 75 mm in diameter. The device is to be capable of testing sprayers with one or two upper and/or lower fixing points. An example is given in [Annex C](#). Other devices with equivalent performance can be used.

WARNING — This test device presents an element of risk when the test is underway. All personnel shall either be kept out of the test area or otherwise protected from hazards such as parts displaced from the sprayer on test.

4.5 Drop test device, to drop the upright sprayer, vertically guided, from a height of (600 ± 20) mm onto a flat level surface, 800 mm x 800 mm x 50 mm in height, made of high density polythene (HDPE) or hard wood placed on a flat level floor. The device shall not affect the impact force of the dropped sprayer. An example is given in [Annex D](#). Other devices with equivalent performance can be used.

4.6 Filling device, by which the volume and flow of water or test liquid can be controlled and adjusted. An example is given in [Annex E](#). Other devices with equivalent performance can be used.

4.7 Weighing devices, with the ability to weigh up to:

- a) 25 kg with a maximum error of ± 1 g;
- b) 2 kg with a maximum error of $\pm 0,1$ g.

4.8 Measuring cylinder, for measuring volumes of up to 1 l with a maximum error of ± 10 ml.

4.9 Timer (stop watch), with a maximum error of $\pm 0,5$ s for measuring periods up to 5 min.

4.10 Pressure supply device, to place the sprayer under pressure using air or water. The pressure shall be adjustable up to 10 bar with a maximum error of ± 5 % of the measured value.

4.11 Pressure gauges, to measure between 0 bar and 25 bar with a maximum error of $\pm 0,15$ bar (equivalent to a class 0,6 pressure gauge according to EN 837-1).

4.12 Polythene bags, the size of which shall be at least 30 cm x 40 cm.

4.13 Polythene sheets, the size of which shall be at least 2 m x 1 m.

5 General

5.1 Test conditions

The tests shall be performed with one new specimen of the sprayer type at an air temperature of 10 °C to 30 °C and relative air humidity of at least 30 %, with no influence of wind or sunlight.

5.2 Sprayer

Assemble the knapsack sprayer in accordance with the instruction handbook. Inspect for tightness of the filling cap, gland nut and other operator controlled couplings. Weigh the complete empty sprayer using a weighing device [4.7 a)] and record the mass in kilograms.

5.3 Functional tests

5.3.1 Shut-off device reliability

Detach the shut-off device assembly with the spray lance from the sprayer and mount it on a frame ([4.3](#)). Connect the shut-off device to a pressurized water supply of $(3 \pm 0,2)$ bar. Fully activate the shut-off device using a frequency of (15 ± 5) cycles/min for a total duration of 25 000 cycles. Inspect functionality and record any leakage occurring within 1 min ± 5 s after completion of the last cycle.

5.3.2 Spray liquid output

The spray liquid output rate q_m of the sprayer for each combination of nozzle/pressure regulator supplied for use with the sprayer shall be measured with a maximum error of ± 1 % at the optimum spray pressure specified in the instruction handbook or at the setting specified in the instruction handbook.

Record the spray liquid output and calculate the percentage deviation σ from the values q_s specified in the instruction handbook using the following equation:

$$\sigma = \frac{q_m}{q_s} \times 100 \%$$

5.3.3 Load carrying straps and their fixation points

WARNING — This test has an element of risk. All personnel shall either be kept out of the test area or otherwise protected from hazards such as parts displaced from the sprayer on test.

Fill the spray tank with water so that the total mass of the sprayer is $7 \text{ kg} \pm 10 \text{ g}$. If the empty mass of the sprayer is over 7 kg the test shall be carried out with the sprayer empty and if the maximum mass of the sprayer filled to the nominal volume is below 7 kg record the mass and test at this mass. Attach the sprayer to a strap test device (4.4) so that each load carrying strap can be tested individually. From the position where the sprayer is carried by a strap in the device, lift the sprayer vertically (200 ± 20) mm and let the sprayer drop. Repeat this 10 times for each load carrying strap.

Inspect for damage.

5.3.4 Stability

Position the empty sprayer on a flat hard surface with an incline of $8,5^\circ \pm 0,2^\circ$ so that the load carrying straps are facing down the slope. Set any lever and the lance in their park position. If there are no park positions, set the lever in its highest position with the lance down the slope.

Check the stability of the sprayer by rotating it at 90° intervals.

Repeat the test with the spray tank filled to the nominal volume.

Record any position in which the sprayer is not stable.

5.3.5 Contents gauge scale and total volume

Place the empty sprayer in an upright position on a flat horizontal surface with any lever in the park position.

Measure and record the volume between the graduations on the spray tank contents gauge scale when filling the spray tank using a measuring cylinder (4.8) or using a device (4.7). Continue until the spray tank is filled to its nominal volume.

Determine the scale error E in percentage using the following equation:

$$E = \frac{V_s - V_m}{V_s} \times 100 \%$$

where

V_s is the volume according to the spray tank scale, in millilitres (ml);

V_m is the measured volume of water filled into the spray tank, in millilitres (ml).

As a second part of the test, fill the spray tank to the upper edge of the filling opening.

For lever-operated sprayer and engine- or motor-driven sprayers, insert the filling filter and close the tank lid.

For compression sprayers, insert and tighten the air pump and remove all liquid from an integrated filling funnel. If the filling opening is situated below any parts of the spray tank, so that air pockets are formed, remove the hose and fill the sprayer through the spray tank outlet opening with air pump mounted.