

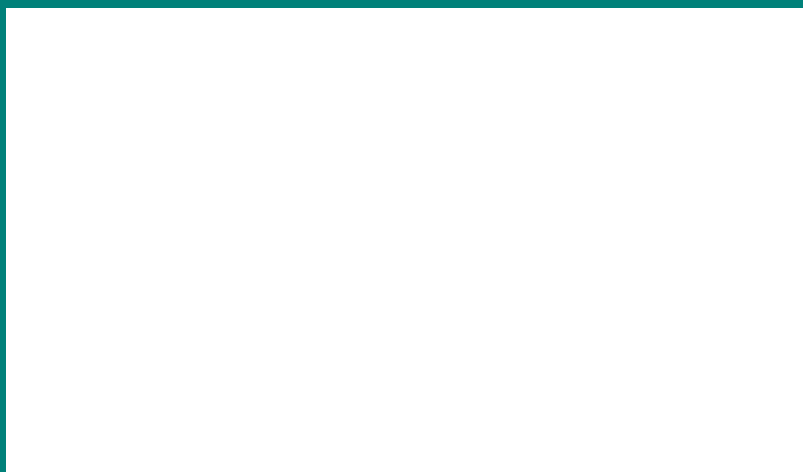
SVENSK STANDARD

SS-ISO 21278-1:2009

Fastställt/Approved: 2009-04-06
Publicerad/Published: 2009-05-20
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 65.060.40

Lantbruk – Växtskyddsutrustning – Preparatpåfyllare – Del 1: Provningsmetoder (ISO 21278-1:2008, IDT)

Equipment for crop protection – Induction hoppers – Part 1: Test methods (ISO 21278-1:2008, IDT)



SWEDISH
STANDARDS
INSTITUTE

Hitta rätt produkt och ett leveranssätt som passar dig

Standarder

Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

Tjänster

Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på.

På så sätt är du säker på att du alltid arbetar efter rätt utgåva.

e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

Leveranssätt

Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

Andra produkter

Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".

Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på sis.se och ger dig en bra bild över hur olika produkter hör ihop.

Standardiseringsprojekt

Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

Find the right product and the type of delivery that suits you

Standards

By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

Services

Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.

e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

Type of delivery

You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

Other products

We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.

Matrices, listed at sis.se, provide an overview of which publications belong together.

Standardisation project

You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Den internationella standarden ISO 21278-1:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 21278-1:2008.

The International Standard ISO 21278-1:2008 has the status of a Swedish Standard. This document contains the official English version of ISO 21278-1:2008.

! © 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), tel +46 8 555 520 00.

Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.

E-mail: sis.sales@sis.se Internet: www.sis.se

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Test materials and equipment	2
5 Test conditions	2
5.1 General	2
5.2 Environmental conditions	2
5.3 Liquid pressure	3
5.4 Volumetric and flow-rate measurement	3
5.5 Weight measurement	3
6 Test methods	3
6.1 Nominal volume of the induction hopper	3
6.2 Total volume of the induction hopper	3
6.3 Precision of the level indicator	4
6.4 Emptying flow rate	4
6.5 Emptying performance with powder	5
6.6 Emptying performance with micro-granular product	6
6.7 Efficiency of the induction hopper internal washing system	6
6.8 Cleaning device for crop protection product cans	7
6.9 Evaluation of hydraulic tightness	9
7 Test report	10
Annex A (normative) Micro-granular test material	11
Annex B (normative) Sticky reference product	12
Annex C (informative) Example test report	13
Bibliography	14

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 21278-1 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*.

ISO 21278 consists of the following parts, under the general title *Equipment for crop protection — Induction hoppers*:

- *Part 1: Test methods*
- *Part 2: General requirements and performance limits*

Introduction

The sprayer main tank may be connected to an introduction hopper in order to prevent chemical cross-contamination, contamination of the operator and of the environment.

Currently two main different types of hopper are available on the market:

- introduction hoppers, which are able to transfer the chemical into the main tank of the sprayer;
- induction hoppers, which are able to transfer the chemical product into the sprayer and partially mix the chemical product, and are able to carry out self-cleaning.

ISO 21278 is applicable to induction hoppers for fertilizers and plant protection products for agricultural crop protection machines and is aimed at verifying their functionality.

Equipment for crop protection — Induction hoppers —

Part 1: Test methods

1 Scope

This part of ISO 21278 specifies the test methods for the verification of the performance limits of induction hoppers, as specified in ISO 21278-2.

2 Normative references

The following referenced documents are indispensable for the application 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, *Equipment for crop protection — Vocabulary*

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

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

3 Terms and definitions

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

3.1

induction hopper

device having a bowl able to transfer and partially mix any kind of liquid or solid plant protection products or fertilizers inside the main tank of the sprayer, and able to self-clean

NOTE The device may be attached to the machine or free-standing, and able to be connected to the sprayer tank only for filling operations.

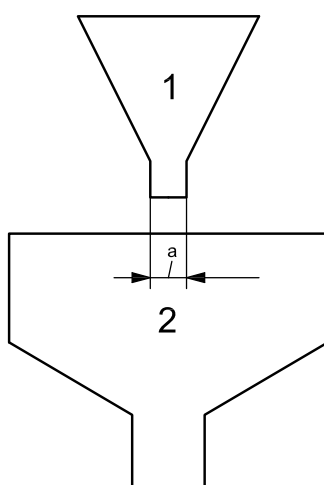
3.2

cleaning device for crop protection product cans

device for cleaning the inside of empty crop protection product cans

4 Test materials and equipment

- 4.1 **Clean water**, without any solids in suspension.
- 4.2 **Solution of water with coloured material**, for its visual determination.
- 4.3 **Copper oxychloride powder**, as defined in Annex A of ISO 5682-2:1997.
- 4.4 **Micro-granules**, as specified in Annex A.
- 4.5 **Sticky reference product**, (as specified in Annex B).
- 4.6 **Loading device**, having an outlet internal diameter of between 30 mm and 40 mm, see Figure 1.



Key

- 1 loading device (e.g. funnel)
- 2 induction hopper to be tested
- ^a Outlet diameter of the loading device.

Figure 1 — Scheme of the positioning of the loading device to load the powder or micro-granules into the induction hopper

5 Test conditions

5.1 General

The induction hopper shall be tested following the manufacturer's instructions as given in the instruction handbook and according to the nominal operating values declared by the manufacturer.

5.2 Environmental conditions

The water temperature shall be between 5 °C and 25 °C.

The environmental temperature, the test liquid temperature, the relative humidity and the atmospheric pressure shall be recorded in the test report.

5.3 Liquid pressure

The liquid pressure shall be measured with a maximum error $\pm 2,5\%$; during the single test the working pressure may vary within $\pm 5,0\%$ of the average value.

5.4 Volumetric and flow-rate measurement

The volumetric and flow-rate measurements shall be within $\pm 1,0\%$ error.

5.5 Weight measurement

The weight measurement for introduced materials shall be within ± 10 g error.

6 Test methods

6.1 Nominal volume of the induction hopper

6.1.1 Test procedure

Use the liquid as defined in 4.1.

Place the induction hopper in the position recommended by the manufacturer, and then fill the bowl up to the maximum filling level as defined in the instruction handbook.

6.1.2 Results

Measure the amount of test liquid inside the bowl. The test results shall be expressed in litres (l).

6.2 Total volume of the induction hopper

6.2.1 Test procedure

Use the liquid as defined in 4.1.

Place the induction hopper in the position recommended by the manufacturer.

If present, the cover is to be open during operation. Continue to fill the bowl up to its upper edge.

6.2.2 Results

Measure the amount of test liquid inside the bowl. Results shall be reported in litres (l).

The percentage gap (V_{over}) between nominal volume (V_{nom}) and total volume (V_{total}) of the induction hopper shall be calculated as follows:

$$V_{\text{over}} = \frac{(V_{\text{total}} - V_{\text{nom}}) \times 100}{V_{\text{nom}}}$$