SVENSK STANDARD
SS-EN ISO 7971-3:2019

Fastställd/Approved: 2019-03-15
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 67.060

Spannmål – Bestämning av bulkdensitet, kallad massa per hektoliter – Del 3: Rutinmässig metod (ISO 7971-3:2019)

Cereals – Determination of bulk density, called mass per hectolitre – Part 3: Routine method (ISO 7971-3:2019)

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Europastandarden EN ISO 7971-3:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 7971-3:2019.

Denna standard ersätter SS-EN ISO 7971-3:2009, utgåva 1

The European Standard EN ISO 7971-3:2019 has the status of a Swedish Standard. This document contains the official version of EN ISO 7971-3:2019.

This standard supersedes the SS-EN ISO 7971-3:2009, edition 1

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS 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, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Spannmål, SIS/TK 435/AG 04.

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 7971-3

March 2019

ICS 67.060

Supersedes EN ISO 7971-3:2009

English Version

Cereals - Determination of bulk density, called mass per hectolitre - Part 3: Routine method (ISO 7971-3:2019)

Céréales - Détermination de la masse volumique, dite masse à l'hectolitre - Partie 3: Méthode pratique (ISO 7971-3:2019)

Getreide - Bestimmung der Schüttdichte, sogenannte Masse je Hektoliter - Teil 3: Routineverfahren (ISO 7971-3:2019)

This European Standard was approved by CEN on 8 February 2019.

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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 7971-3:2019: E

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European foreword

This document (EN ISO 7971-3:2019) has been prepared by Technical Committee ISO/TC 34 "Food products" in collaboration with Technical Committee CEN/TC 338 “Cereal and cereal products” 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 September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

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

This document supersedes EN ISO 7971-3:2009.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 7971-3:2019 has been approved by CEN as EN ISO 7971-3:2019 without any modification.

Cereals — Determination of bulk density, called mass per hectolitre —

Part 3:
Routine method

1 Scope

This document specifies a routine method for the determination of bulk density, called "mass per hectolitre", of cereals as grain using manual or automatic, mechanical, electric or electronic mass per hectolitre measuring instruments.

NOTE Further details of the measuring instruments are specified in ISO 7971-2:2019, 6.4.

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 7971-2:2019, *Cereals — Determination of bulk density, called mass per hectolitre — Part 2: Method of traceability for measuring instruments through reference to the international standard instrument*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 http://www.electropedia.org/

3.1
mass per hectolitre
bulk density
test weight
<cereals> ratio of the mass of a cereal to the volume it occupies after being poured into a container under defined manufacturer's conditions

Note 1 to entry: Mass per hectolitre is expressed in kilograms per hectolitre of grains as received.

Note 2 to entry: Mass per hectolitre, as defined in this document, is different from "packing density" or "intrinsic density" of cereals.

[SOURCE: ISO 7971-1:2009, 2.1, modified — In the definition, "defined manufacturer's conditions" has replaced "well-defined conditions".]

4 Principle

The mass per hectolitre of a cereal is obtained from the mass of a volume of cereal determined under controlled sample filling and flow conditions.

The mass per hectolitre can be affected by

a) space between the grains, which depends on the grain size and shape, and

b) density of the grains.

5 Apparatus

5.1 General requirement for mass per hectolitre apparatus. Any apparatus (5.2 and 5.3) shall be verified in accordance with ISO 7971-2 and shall fulfil the performance demands specified therein.

5.2 Hand-operated measuring instrument. Apparatus consisting of a filling hopper, a measuring container and the accessories necessary for their use.

The manner in which the grain is poured into the measuring container and the way in which it packs into the container can cause the measurements taken by the various instruments to vary and lead to measurement errors.

To minimize such variations, special attention should be given to ensuring that the design of the instruments and their size, material and shape are appropriate.

NOTE Annexes A and B contain examples of technical specifications of two hand-operated instruments with a capacity of 1 l.

5.3 Automatic measuring instrument. This category includes various types of devices, some of which can be used on their own or combined with an infrared analyser.

The measurement is based on the application of formulae to allow the correcting of the bias and/or the drifts monitored. It does not include manual weighing. The numeric value of the hectolitre mass is directly displayed.

5.4 Analytical balance, capable of being read to the nearest 0,1 g or 0,01 g depending on the volume of the container (see 6.2).

5.5 Spirit level.

6 Procedure

6.1 General

The measurements shall be taken using grain from which large impurities (straw, stones, large amounts of loose husks, etc.) have been discarded, taking environmental conditions into consideration to ensure that there is no difference in temperature between the grain and the room in which the test is performed.

Determine the mass per hectolitre in duplicate. For all the devices and for every sample, it is advisable to perform the two measurements on two different grain test portions, when the sample size enables it.

NOTE Repeating the measurement on the same grain test portion changes the friction coefficient which therefore makes it easier for the grains to slide; they are then more tightly packed, which increases the value of the mass per hectolitre.

6.2 Hand-operated instruments

Check that the various components of the instrument are clean and that they are working properly.

Make sure that equipment is placed on a firm, flat base, after using a spirit level to check that the base is horizontal.

Take great care to avoid any impact during filling. If the apparatus is jolted, cancel the test and start again.

Each type of apparatus is different; use each according to the manufacturer's instructions.

When using the analytical balance (5.4), weigh to the nearest 1 g for a 1 l container or the nearest 0,1 g for apparatus with a container of smaller volume.

6.3 Automatic instruments

As the operations to be performed prior to the actual measurement differ according to the type of equipment used, reference to the manufacturer's instructions is recommended.

Ensure that the instrument is placed on a horizontal surface in a room protected from extreme temperatures, humidity, dust and vibrations.

Take particular care to

a) select the correct cereal to be measured to ensure that the right calibration is used,

b) use the volume of cereals recommended for the device in question, and

c) empty the collector drawer between samples.

6.4 Expression of results

Take the arithmetic mean of the two determinations as the result if the repeatability conditions are met.

Express the result to the nearest 0,1 kg/hl.

If they are not met, take as a final result the mean of the four measurements.

Specify in the analysis report the conditions for obtaining the final result that can be attributed to sample variability.

7 Precision

7.1 Interlaboratory trial

Details of an interlaboratory test on the precision of the method are summarized in Annex C. The values derived from this interlaboratory test cannot be applied to other mass per hectolitre ranges and matrices than those given.

7.2 Repeatability

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, shall in not more than 5% of cases be greater than the repeatability limit

$r = 0{,}4$

for products where the mass per hectolitre is between 67,5 kg/hl and 84,5 kg/hl (see Tables C.1 and C.2, and Figure C.1).

7.3 Reproducibility

The absolute difference between two single test results, obtained using the same method on identical test material in different laboratories with different operators using different equipment.

In practice, it is not appropriate to compare the results from two laboratories if the test concerned imposes repeatability conditions.