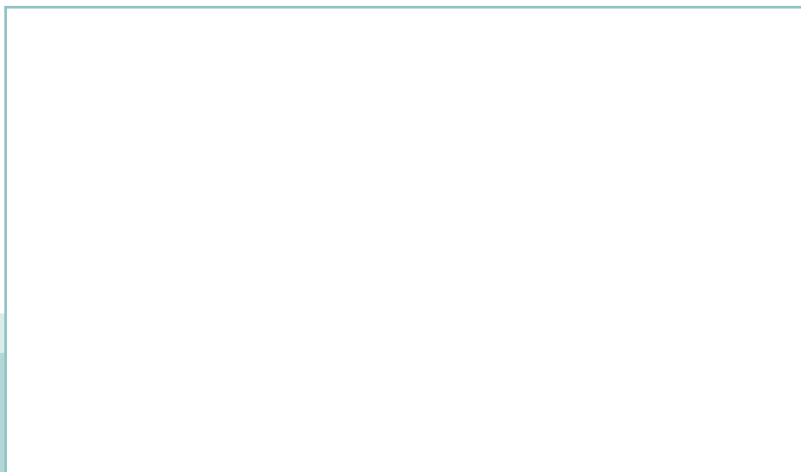


SVENSK STANDARD

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Wheat and wheat flour – Gluten content – Part 2: Determination of wet gluten and gluten index by mechanical means (ISO 21415-2:2015)



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Denna standard ersätter SS-EN ISO 21415-2:2008, utgåva 1.

The European Standard EN ISO 21415-2:2015 has the status of a Swedish Standard. This document contains the official English version of EN ISO 21415-2:2015.

This standard supersedes the Swedish Standard SS-EN ISO 21415-2:2008, edition 1.

**Förhållandet till övriga delar under samma huvudtitel - Utdrag ur Förord i ISO 21415-2:2015/
Relations to other parts under the same general title - Extract from the Foreword of ISO 21415-2:2015**

ISO 21415 consists of the following parts, under the general title *Wheat and wheat flour — Gluten content*:

- Part 1: *Determination of wet gluten by a manual method*
- Part 2: *Determination of wet gluten and gluten index by mechanical means*
- Part 3: *Determination of dry gluten from wet gluten by using an oven-drying method*
- Part 4: *Determination of dry gluten from wet gluten by a rapid drying method*

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EUROPEAN STANDARD

EN ISO 21415-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2015

ICS 67.060

Supersedes EN ISO 21415-2:2008

English Version

Wheat and wheat flour - Gluten content - Part 2: Determination of wet gluten and gluten index by mechanical means (ISO 21415-2:2015)

Blé et farines de blé - Teneur en gluten - Partie 2:
Détermination du gluten humide et du gluten index par
des moyens mécaniques (ISO 21415-2:2015)

Weizen und Weizenmehl - Glutengehalt - Teil 2:
Bestimmung von Feuchtgluten und Glutenindex durch
mechanische Verfahren (ISO 21415-2:2015)

This European Standard was approved by CEN on 13 June 2015.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 21415-2:2015) 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 April 2016, and conflicting national standards shall be withdrawn at the latest by April 2016.

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 supersedes EN ISO 21415-2:2008.

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Endorsement notice

The text of ISO 21415-2:2015 has been approved by CEN as EN ISO 21415-2:2015 without any modification.

Introduction

The alternative techniques specified in this part of ISO 21415 and in ISO 21415-1 for isolation of wet gluten (i.e. manual extraction and mechanical extraction) do not generally yield equivalent results. The reason for this is that for full development of the gluten structure the dough needs to be allowed to rest. Hence, the result obtained by manual extraction is usually greater than that obtained by mechanical extraction, especially in the case of wheat with high gluten content. Therefore, the test report should always state the technique used.

Wheat and wheat flour — Gluten content —

Part 2:

Determination of wet gluten and gluten index by mechanical means

1 Scope

This part of ISO 21415 specifies a method for determining the content of wet gluten and the gluten index for wheat flours (*Triticum aestivum* L. and *Triticum durum* Desf.) by mechanical means. This method is directly applicable to flours. It also applies to common and durum wheat after grinding, if their particular size distribution meets the specification given in [Table B.1](#).

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

wet gluten

viscoelastic substance consisting mainly of two protein fractions (gliadin and glutenin) in hydrated form, obtained in the way indicated in this part of ISO 21415 or in ISO 21415-1

2.2

gluten index

proportion of wet gluten remaining on the sieve after centrifugation

Note 1 to entry: The higher the index, the stronger the gluten is.

2.3

ground wheat

result of experimental grinding of whole wheat with the granulometry cited in [Table B.1](#)

2.4

flour

finely ground wheat endosperm with a granulometry of less than 250 µm

3 Principle

Preparation of a paste from a sample of flour or of ground wheat and a sodium chloride solution in the equipment's chamber; separation of the wet gluten by washing this paste with a sodium chloride solution, followed by removal of excess washing solution by centrifugation and weighing the residue. The gluten index is obtained after centrifuging to force the wet gluten through a special sieve. The percentage of wet gluten remaining on the sieve after centrifuging is defined as the gluten index.

4 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified and distilled or demineralized water, or water of equivalent purity.

SS-EN ISO 21415-2:2015 (E)**4.1 Sodium chloride solution, 20 g/l.**

Dissolve 200 g of sodium chloride (NaCl) in water, then dilute to 10 l. When using this, it is recommended that the temperature of the solution be $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

It is advisable to prepare this solution specially every day.

4.2 Solution of iodine/potassium iodide (Lugol's solution).

Dissolve 2,54 g of potassium iodide (KI) in water. Add 1,27 g of iodine (I_2) to this solution and, when the reagents have completely dissolved, dilute to 100 ml with water.

5 Apparatus

Usual laboratory apparatus and, in particular, the following items.

5.1 Automatic gluten separation unit ¹⁾, (single or double) consisting of a washing/mixing chamber, mill(s) (see [Figures A.1](#) and [A.2](#)) and an electronically controlled distribution device for extracting the gluten.

5.1.1 Mixing/washing chamber(s), fitted with replaceable chrome-plated sieve support(s) with polyester sieves with an 88 μm mesh gap and polyamide sieves with an 840 μm mesh gap.

The distance between the milling hook and the chrome-plated sieve support shall be $0,7 \text{ mm} \pm 0,05 \text{ mm}$. This value should be checked with the calibrated thickness shims supplied.

5.1.2 10 l plastic drum, to contain the sodium chloride solution ([4.1](#)) connected to the equipment by a plastic tube.

5.1.3 Distribution system, consisting of a peristaltic pump allowing the sodium chloride solution ([4.1](#)) used for washing the gluten to be delivered at a constant rate of between 50 ml/min and 56 ml/min.

For a detailed description of the unit and for detailed operating instructions, users of this part of ISO 21415 should consult the leaflet of the maker of the equipment used.

5.2 Dispenser, for the sodium chloride solution, permitting delivery of 3 ml to 10 ml with an accuracy of $\pm 0,1 \text{ ml}$.

5.3 Centrifuge, capable of maintaining a rotational frequency of $6\,000 \pm 5$ per minute and producing a radial acceleration of $2\,000 g$, fitted with 2 perforated plates with holes of diameter 600 μm and/or 2 receptacles 22 mm in diameter equipped with a grid containing 600 μm holes, to determine the gluten index (cf. [Figures A.3](#) and [A.4](#)).

5.4 Balance, calibrated to 0,01 g.

5.5 Stainless steel spatula.

5.6 Beakers with 500 ml capacity (to catch the rinsing water).

5.7 Stainless steel or plastic grippers.

1) The Glutomatic unit (types 2100 and 2200) made by Perten Instruments AB (Sweden) is the mechanical device most widely used at present for this purpose. This information is given for the benefit of users of this part of ISO 21415 and in no way implies that ISO approves or recommends exclusive use of this device. Other equipment may also be used if it yields similar results to those of the Glutomatic unit or those of the method described in ISO 21415-1.

5.8 Lab crusher, capable of producing a ground product with a granulometry meeting the requirements of [Table B.1](#).

5.9 Watch glass.

6 Sampling

It is important for the laboratory to receive a truly representative sample which has not been damaged or altered during transport or storage.

The method specified in this part of ISO 21415 does not cover sampling. A recommended sampling method is given in ISO 24333.

7 Preparation of test sample

Homogenize the samples. Before measuring the gluten content, grind the wheat grains and crush them with a lab crusher ([5.8](#)), as indicated in [Annex B](#). Special precautions should be taken during grinding and storing to prevent any alteration to the moisture content of samples.

8 Procedure

8.1 General

The operations of preparation and washing of the dough are carried out continuously with automatic equipment ([5.1](#)). Follow the instructions supplied by the manufacturer of the equipment used.

8.2 Testing

Weigh 10 g of the sample to within 0,01 g for testing and transfer to the unit's washing/mixing chamber ([5.1.1](#)). Ensure that the washing chamber is fitted with a suitable sieve, which has been previously cleaned and moistened.

When testing flour samples, one or more fine polyester sieve(s) (88 µm aperture) is/are used. When testing ground wheat, chrome-plated sieve supports fitted with a slotted ring are also required with polyamide sieves with a mesh gap of 840 µm. In that case, the test starts with the fine sieve and in addition a coarse sieve is used for the second step in the method.

The gluten index is generally measured using only 88 µm polyester sieves and 840 µm polyamide sieves for the preparation of the wet gluten. If metal sieves are used, this shall be clearly noted in the test report.

8.3 Paste preparation

As a starting suggestion, add 4,8 ml of sodium chloride solution ([4.1](#)) to the test sample with the dispenser ([5.2](#)). Aim the flow of saline solution at the chamber wall so that it does not go through the sieve. Gently shake the washing chamber to ensure that the saline solution is uniformly distributed over the flour.

It may be necessary to adjust the amount of saline solution used for samples with very high or very low gluten content. If forming a consistent paste turns out to be difficult (the chamber is flooded during washing), the amount of saline solution added should be reduced (minimum of 4,2 ml). If very hard firm gluten forms during mixing, the amount of solution should be increased to 5,2 ml.

The preparation time is set by the manufacturer at 20 s, but this may be adjusted by the user, if necessary. If so, contact the manufacturer to obtain information on adjusting the regulator.