



International
Standard

ISO 21415-2

**Wheat and wheat flour — Gluten
content —**

Part 2:
**Determination of wet gluten and
gluten index by mechanical means**

Blé et farines de blé — Teneur en gluten —

*Partie 2: Détermination du gluten humide et du gluten index par
des moyens mécaniques*

**Third edition
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Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	2
5 Reagents	2
6 Apparatus	2
7 Sampling	3
8 Preparation of test sample	3
9 Procedure	3
9.1 General.....	3
9.2 Testing.....	3
9.3 Paste preparation.....	3
9.4 Paste washing.....	4
9.4.1 Washing time.....	4
9.4.2 Flour.....	4
9.4.3 Ground wheat.....	4
9.4.4 Special case.....	4
9.5 Spinning and weighing the wet gluten.....	4
9.6 Determining the gluten index.....	4
9.7 Number of measurements.....	5
10 Calculations and record of results	5
11 Precision	5
11.1 Interlaboratory test.....	5
11.2 Repeatability.....	6
11.3 Reproducibility.....	6
11.4 Critical difference.....	7
11.4.1 Comparison of two sets of measurements in the same laboratory.....	7
11.4.2 Comparison of two sets of measurements in two laboratories.....	7
12 Test report	8
Annex A (informative) Washing chamber and mill of the Glutomatic unit and centrifuge	9
Annex B (normative) Preparation of ground wheat	12
Annex C (informative) Results of interlaboratory test	13
Annex D (informative) Proficiency tests data for commercial flours and wheats	20
Bibliography	29

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).

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This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 4, *Cereals and pulses*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 338, *Cereal and cereal products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 21415-2:2015), which has been technically revised.

The main changes are as follows:

- fidelity requirements (see [Clause 10](#)) have been changed in accordance with a new ring-test organized by the Academy of National Food and Strategic Reserves Administration of China (see [Annex C](#)).

A list of all parts in the ISO 21415 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.

Introduction

The alternative techniques specified in this document and in ISO 21415-1^[5] 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.

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Wheat and wheat flour — Gluten content —

Part 2:

Determination of wet gluten and gluten index by mechanical means

1 Scope

This document 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 document is directly applicable to flours. It is also applicable to common and durum wheat after grinding, if their particular size distribution meets the specification given in [Table B.1](#).

NOTE This document is related to ICC 137/1^[7], ICC 155^[8] and AACC Method 38-12.02^[9].

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology 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/>

3.1

wet gluten

viscoelastic substance consisting mainly of two protein fractions (gliadin and glutenin) in hydrated form

Note 1 to entry: Wet gluten is obtained in the way indicated in this document or in ISO 21415-1^[5].

3.2

gluten index

mass of *wet gluten* ([3.1](#)) remaining on the sieve after centrifugation per 100 g of total wet gluten

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

3.3

ground wheat

result of experimental grinding of whole wheat

Note 1 to entry: The required granulometry is cited in [Table B.1](#).

3.4

flour

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

4 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.

5 Reagents

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

5.1 Sodium chloride solution, 20 g/l.

Dissolve 200 g of sodium chloride (NaCl) in water, then dilute to 10 l. The temperature of the solution shall be equilibrated to $22\text{ °C} \pm 2\text{ °C}$.

6 Apparatus

The usual laboratory apparatus and, in particular, the following items shall be used.

6.1 Automatic gluten separation unit¹⁾, (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.

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

6.1.2 10 l plastic drum, to contain the sodium chloride solution ([5.1](#)) connected to the equipment by a plastic tube.

6.1.3 Distribution system, consisting of a peristaltic pump allowing the sodium chloride solution ([5.1](#)) 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 document should consult the leaflet of the maker of the equipment used.

6.2 Dispenser, for the sodium chloride solution, permitting delivery of 4,2 ml to 5,2 ml. The most used volume is 4,8 ml and therefore the setting of the equipment shall be able to distribute this volume.

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

6.4 Balance, capable of weighing to the nearest 0,01 g.

6.5 Stainless steel spatula.

1) The Glutomatic System made by Perten Instruments AB (Sweden) is the mechanical device most widely used at present for this purpose. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product. Equivalent products may be used if they can be shown to lead to the same results.

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

6.7 Stainless steel or plastic grippers.

6.8 Laboratory grinder, capable of producing a ground product with a granulometry meeting the requirements of [Table B.1](#).

7 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 document does not cover sampling. A suitable sampling method is given in ISO 24333^[6] or ISO 18390^[4].

8 Preparation of test sample

Homogenize the samples. Before measuring the gluten content, grind the wheat grains with a laboratory grinder (6.8), as indicated in [Annex B](#). Special precautions should be taken during grinding and storing to prevent any alteration to the moisture content of samples.

9 Procedure

9.1 General

Automatic equipment (6.1) carries out the operations of preparation and washing of the dough continuously. Follow the instructions supplied by the manufacturer of the equipment used.

Sample and sodium chloride solution shall be equilibrated at temperature of $22\text{ °C} \pm 2\text{ °C}$.

9.2 Testing

Weigh 10 g of the sample to within 0,01 g for testing and transfer to the unit's washing/mixing chamber (6.1.1). 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.

9.3 Paste preparation

As a starting suggestion, add 4,8 ml of sodium chloride solution (5.1) to the test sample with the dispenser (6.2). 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 can 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.