

Maize - Determination of moisture content (on milled grains and on whole grains) (ISO 6540:2021)

This document is a preview generated by EVS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 6540:2021 sisaldab Euroopa standardi EN ISO 6540:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 6540:2021 consists of the English text of the European standard EN ISO 6540:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.03.2021.	Date of Availability of the European standard is 03.03.2021.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 67.060

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 6540

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2021

ICS 67.060

Supersedes EN ISO 6540:2010

English Version

Maize - Determination of moisture content (on milled grains and on whole grains) (ISO 6540:2021)

Maïs - Détermination de la teneur en eau (sur grains broyés et sur grains entiers) (ISO 6540:2021)

Mais - Bestimmung des Feuchtegehalts (von gemahlene und ganzen Körnern) (ISO 6540:2021)

This European Standard was approved by CEN on 13 February 2021.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 6540:2021) has been prepared by Technical Committee CEN/TC 338 "NA" 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 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.

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 6540:2010.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 6540:2021 has been approved by CEN as EN ISO 6540:2021 without any modification.

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Reference method	1
4.1 Principle.....	1
4.2 Apparatus.....	1
4.3 Sampling.....	2
4.4 Preparation of the test sample.....	2
4.4.1 Products not requiring to be ground.....	2
4.4.2 Products requiring to be ground.....	3
4.5 Procedure.....	3
4.5.1 Number of determinations.....	3
4.5.2 Test portion.....	3
4.5.3 Drying.....	4
4.5.4 Weighing.....	4
4.6 Expression of results.....	4
4.7 Precision.....	5
4.7.1 Interlaboratory test.....	5
4.7.2 Repeatability.....	5
4.7.3 Reproducibility.....	5
4.7.4 Comparison of two groups of measurements in a laboratory.....	5
4.7.5 Comparison of two groups of measurements in two laboratories.....	5
4.7.6 Uncertainty.....	6
4.7.7 Comparison with the absolute method.....	6
4.8 Notes on procedure.....	6
4.9 Test report.....	6
5 Routine method on whole grains	7
5.1 Principle.....	7
5.2 Apparatus.....	8
5.3 Sampling.....	8
5.4 Procedure.....	8
5.4.1 Test portion.....	8
5.4.2 Drying.....	8
5.4.3 Number of determinations.....	8
5.5 Expression of results.....	9
5.5.1 Method of calculation and formulae.....	9
5.5.2 Repeatability.....	9
5.5.3 Reproducibility.....	9
5.5.4 Comparison of two groups of measurements in a laboratory.....	9
5.5.5 Comparison of two groups of measurements in two laboratories.....	10
5.5.6 Application of fidelity limits.....	10
5.6 Remark.....	10
5.7 Test report.....	10
Annex A (informative) Absolute method	11
Annex B (informative) Interlaboratory test results	18
Annex C (informative) Application of fidelity data for the whole grains method	24
Bibliography	25

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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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 second edition cancels and replaces the first edition (ISO 6540:1980), which has been technically revised. The main changes compared with the previous edition are as follows:

- Clauses 7 to 10 and 17 to 20 (now [4.5](#) to [4.9](#) and [5.4](#) to [5.7](#)) and the annexes have been revised.

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 basic reference method and the routine reference method relating to cereals (see ISO 712) are only applicable to other cereals than maize and cereal products. Therefore, this document has been developed to specify the two methods for maize on the basis of research works published in 1979^[4].

The basic reference method for maize, which is called the “absolute method”, requires special equipment and experienced personnel, and can only be applied in specialized laboratories.

Due to the very high moisture content that can be present in samples of maize (sometimes greater than a mass fraction of 40 %) and because of the size and texture of the grains, the determination of the moisture in maize raises problems with regard to its grinding and pre-drying.

Consequently, to allow the pre-drying and grinding to be avoided, this document also describes a routine method for whole grains, which is easier to use and allows working in series. Its response time is longer but the workload is lower, because of the absence of grinding. However, this practical whole grain method has a positive bias of about a mass fraction of 0,30 % compared to the reference method.

Maize — Determination of moisture content (on milled grains and on whole grains)

1 Scope

This document specifies two methods:

- a reference method for the determination of the moisture content of maize grains and ground whole maize, groats, grits and maize flour, see [Clause 4](#);
- a routine method for the evaluation of the moisture content of maize in whole grains, see [Clause 5](#).

The latter is not suitable for use for experts' reports, or for calibration or checking of humidity meters, because of its significant bias to the reference method (see [Table B.3](#)).

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 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

moisture content of maize

loss in mass undergone by a product under specified conditions

Note 1 to entry: It is expressed as a percentage.

4 Reference method

4.1 Principle

If necessary, grinding of a sample, after pre-conditioning, if required. Drying of a test portion at a temperature between 130 °C and 133 °C, under conditions that enable a result to be obtained in agreement with that obtained by the absolute method (see [Annex A](#)).

4.2 Apparatus

4.2.1 Analytical balance, able to weight with an accuracy of $\pm 0,001$ g and therefore having a display accuracy of 0,000 1 g.

4.2.2 Analytical balance, able to weight with an accuracy of $\pm 0,1$ g and therefore having a display accuracy of 0,01 g.