



BSI Standards Publication

**Cereals (wheat and barley) — Technical  
Report of the interlaboratory studies for the  
determination of moisture and protein in whole  
kernels by near infrared spectroscopy**

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## National foreword

This Published Document is the UK implementation of CEN/TR 17474:2020.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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**CEN/TR 17474**

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**Cereals (wheat and barley) - Technical Report of the  
interlaboratory studies for the determination of moisture  
and protein in whole kernels by near infrared  
spectroscopy**

Céréales (blé et orge) - Rapport technique des essais  
interlaboratoires pour la détermination de la teneur en  
eau et en protéines par spectroscopie proche  
infrarouge sur des grains entiers

Getreide - Technischer Bericht des Ringtestversuchs  
zur Bestimmung des Feuchte- und Proteingehalts von  
ganzen Körnern mittels Nahinfrarotspektroskopie

This Technical Report was approved by CEN on 2 March 2020. It has been drawn up by the Technical Committee CEN/TC 338.

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## **European foreword**

This document (CEN/TR 17474:2020) has been prepared by Technical Committee CEN/TC 338 “Cereal and cereal products”, the secretariat of which is held by AFNOR.

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.

## **Introduction**

The determination of moisture and protein content in whole kernels of barley and wheat can be done using a near infrared spectrometer.

This document presents the results of 3 interlaboratory tests implementing this routine method and their overall statistical treatment.

The outcomes have been used to fix the precision (repeatability and reproducibility) of EN 15948, "Cereals — Determination of moisture and protein - Method using near infrared spectroscopy in whole kernels".

The 3 interlaboratory tests have been managed by FOSS Analytical AB (Sweden) in 2008, by CHOPIN Technologies (France) in 2012 and by PERTEN Instruments AB (Sweden), a PerkinElmer company, in 2013 in accordance with ISO 5725-2.

## 1 Scope

This document defines the repeatability and the reproducibility of a method using near infrared spectroscopy in whole kernels for the determination of moisture and protein on wheat and barley. The performance of the method (accuracy) is found in EN 15948.

The values derived from the report are applicable to the following concentration ranges:

- for wheat:
  - moisture content range from 9,5 % – 15,7 %;
  - protein content range from 10,0 % DM to 18,6 % DM;
- for barley:
  - moisture content range from 10,6 % – 15,9 %;
  - protein content range from 9,2 % DM – 15,4 % DM.

## 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.

EN 15948, *Cereals - Determination of moisture and protein - Method using Near-Infrared Spectroscopy in whole kernels*

ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

EN ISO 12099, *Animal feeding stuffs, cereals and milled cereal products - Guidelines for the application of near infrared spectrometry (ISO 12099)*

## 3 Terms and Definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

## 4 Interlaboratory tests

### 4.1 FOSS

An interlaboratory test, organized by the FOSS Analytical AB (Sweden) company in 2008, involving 20 participants from 12 countries was carried out on 6 wheat and 4 barley samples from the 2007 harvest, containing protein and moisture in various concentrations. The participants were the master laboratories of European grain networks. The grain networks did also assist in the collection of the samples (Table 1).