
**Wheat flour and durum wheat
semolina — Determination of colour
by diffuse reflectance colorimetry**

*Farine de blé tendre et semoule de blé dur — Détermination de la
couleur par colorimétrie de réflectance diffuse*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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).

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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).

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.

Wheat flour and durum wheat semolina — Determination of colour by diffuse reflectance colorimetry

1 Scope

This document specifies a method for the determination of colour in durum wheat semolina and wheat flour by diffuse reflectance colorimetry.

It is applicable to industrial semolina and flour.

The method can be applicable to flour obtained from experimental mill.

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

colour metric space

expression of the colour of an object or of a light source by some parameters expressed by figures

3.2

illuminant

light source characterized by a spectral curve, where the energy relative distribution is defined in the field of wavelengths that are able to influence the object colour vision

4 Principle

The principle is based on the measurement of colour directly on semolina and flour by a reflectance colorimeter.

The colour of wheat milling product (semolina and flour) is due to the pigments naturally present in wheat grains. These pigments (xanthophyll's and carotenoids) are responsible for the colour visually perceived in milling products.

5 Apparatus

5.1 Reflectance colorimeter¹⁾ with head of measurement suitable for carrying out measurements of absolute chromaticity. Consists of a setting system and a cell samples-driver.

The colorimeter shall be characterized by the following technical characteristics:

- system of measurement with pulsed xenon lamp diffused to the light and receipt of the radiation reflected to 0° (geometry d/0°);
- circular surface of measurement;
- measurements of chromaticity expressed as L^* , a^* , b^* (see CIE 1976) with the use of the illuminant CIE D₆₅ (illuminant D₆₅: representing one of the relative spectral distribution of the day-light energy that corresponds to a proximal colour temperature similar to 6 504 K);
- time of measurement 1 s;
- possibility of calibration with reference plate;
- repeatability within a DE * 0,6 (30 measurements effected to an interval of 10 s on the reference plate).

5.2 Accessory samples-driver and cell for the measurement of granular materials.

The dimensions of the cell that defines the quantity of sample submitted to the test are: external diameter = 60 mm, diameter inside hole = 22 mm, thickness = 9 mm.

5.3 Reference plate in porcelain for the initial setting of the colorimeter.

6 Sample preparation

Before the analysis, the samples shall be carefully homogenized.

Sampling is not part of the method specified in this document. A recommended sampling method is given in ISO 24333.

7 Procedure

7.1 General

Before each series of measurements, the apparatus shall be calibrated.

The colorimeter calibration shall be made through opaque stable materials (as ceramics, glaze etc.) samples supplied by manufacturers. When the colorimeter (5.1) is used, a further calibration for better measurement accuracy can be performed using a reference material similar to the colour of the samples to be measured.

Before the calibration, verify the integrity of the reference plate (5.3) used as a reference (e.g. for the absence of linings or colour not homogeneous). Also, for the setting, verify that the coordinates are those reported on the reference standard.

1) Laboratories involved in the ring test nearly all used a colorimeter CR 400 or CR 410 Minolta. These are fit apparatus responding to the required technical characteristics. Minolta is a trade name and is an example of a suitable apparatus available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of these products.