

# Teknisk specifikation

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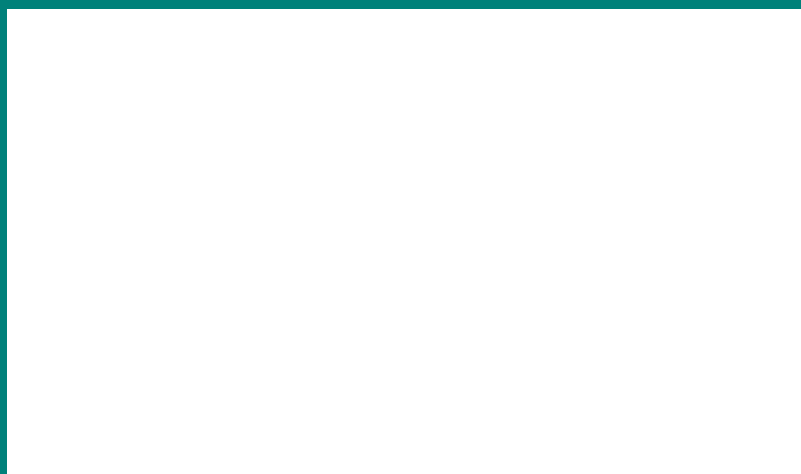
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**Cereals and cereal products – Common wheat (*Triticum aestivum* L.) – Determination of alveograph properties of dough at adapted hydration from commercial or test flours and test milling methodology**



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TECHNICAL SPECIFICATION  
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**CEN/TS 15731**

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English Version

**Cereals and cereal products - Common wheat (*Triticum aestivum* L.) - Determination of alveograph properties of dough at adapted hydration from commercial or test flours and test milling methodology**

Céréales et produits céréaliers - Blé tendre (*Triticum aestivum* L.) - Détermination des propriétés alvéographiques d'une pâte à hydratation constante adaptée de farine industrielle ou d'essai et méthodologie pour la mouture d'essai

Getreide und Getreideerzeugnisse - Weizen (*Triticum aestivum* L.) - Bestimmung der Eigenschaften von Teig bei adaptierter Flüssigkeitszufuhr zu handelsüblichen Mehlen oder Versuchsmehlen bei gleichen Versuchsmahlverfahren mittels Alveograph

This Technical Specification (CEN/TS) was approved by CEN on 9 March 2008 for provisional application.

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## **Foreword**

This document (CEN/TS 15731:2008) has been prepared by Technical Committee CEN/TC 338 "Cereals 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.

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## Introduction

The end-use value of wheat is determined by a number of properties that are useful in the manufacture of baked products such as bread, rusks, biscuits, etc.

Such properties include the important viscoelastic (rheological) properties of dough formed as a result of flour hydration and kneading. An alveograph is used to study the main parameters by subjecting a dough test piece to biaxial extension (producing a dough bubble) at adapted hydration by inflating it with air, which is similar to the deformation to which it is subjected during panary fermentation.

Recording the pressure generated inside the bubble throughout the deformation of the dough test piece until rupture provides information on:

- resistance of the dough to deformation, or its strength (stiffness). It is expressed by the maximum pressure parameter “ $T$ ”;
- extensibility or the possibility of inflating the dough to form a bubble. It is expressed by the parameters of extensibility “ $A$ ” or swelling “ $Ex$ ”;
- elasticity of the dough during biaxial extension. It is expressed by the elasticity index “ $lec$ ”;
- energy required to deform the dough bubble until it bursts, which is proportional to the area of the alveogram (sum of the pressures throughout the deformation process). It is expressed by the parameter “ $Fb$ ”.

It is generally accepted that the tenacity “ $T$ ” and the extensibility “ $A$ ” shall exceed a minimum level which can be varied, depending on the particular end use to which the flour is to be put. The  $T/A$  ratio is a measurement of the balance between tenacity and extensibility.

Alveographs are commonly used throughout the wheat and flour industry, for the following purposes:

- selecting and assessing different varieties of wheat and marketing batches of wheat;
- blending different batches of wheat or flour to produce a batch with given values for the alveographic criteria ( $W$ ,  $P$  and  $L$ ) complying with the proportional laws of blending;

Alveographs are used both on the upstream side of the industry for marketing, selecting and assessing the different varieties and on the downstream side throughout the baking industries (see Bibliography).

## 1 Scope

This document specifies a method that uses an alveograph to determine the rheological properties of different types of dough at adapted hydration obtained from “soft” to “hard” wheat flour (*Triticum aestivum* L.) produced by industrial milling or laboratory test milling.

It describes the alveograph test and how to use a laboratory mill to produce flour in two stages:

- Stage 1: preparation of the wheat grain for milling to make it easier to separate the bran from the endosperm (see Clause 7);
- Stage 2: the milling process itself, including the break system involving three fluted rollers, reduction of particle size between two smooth rollers and the use of a centrifugal sieving machine to grade the products (see Clause 8).

## 2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 712, *Cereals and cereal products - Determination of moisture content - Routine reference method*

ISO 7700-1, *Check of the calibration of moisture meters -- Part 1: Moisture meters for cereals*

## 3 Principle

The principle of measurement involves the evaluation, during deformation, of the behaviour of dough obtained from a mixture of different types of flour and salt water. A dough disk is subjected to a constant air flow; at first it withstands the pressure, then it swells into a bubble, according to its extensibility and ruptures. The change in the dough is measured and recorded in the form of a curve called an alveogram.

## 4 Reagents

Unless otherwise specified, use only reagents of recognised analytical quality, and distilled or demineralised water, or water of equivalent purity.

**4.1 Sodium chloride solution**, obtained by dissolving  $(25 \pm 0,2)$  g of sodium chloride in distilled water and then making it up to 1 000 ml. This solution shall not be stored for more than 15 days and its temperature shall be  $(20 \pm 2)^\circ\text{C}$  when used.

**4.2 Refined vegetable oil**, low in polyunsaturates such as peanut oil. It is possible to use olive oil if its acid index value is less than 0,4 (determined according to EN ISO 660). Store in a dark place in a closed container and replace regularly (every 3 months).

Alternatively, **liquid paraffin** (also known as “vaseline oil”), with an acid index value less than or equal to 0,05 and the lowest possible viscosity (maximum 60 mPa.s (60 cP) at  $20^\circ\text{C}$ ).

**4.3 Cold degreasing agent** - optimum safety.<sup>1)</sup>

## 5 Apparatus

Common laboratory equipment, including the following:

**5.1 Mechanical cleaner** fitted with sieves for wheat cleaning, in accordance with the manufacturer's requirements.

**5.2 Conical or riffle sample divider.**

**5.3 Analytical balance** accurate to 0,01 g.

**5.4 50 ml glass burette** graduated in 0,1 ml increments, stand-mounted.

**5.5 Rotary blender**<sup>2)</sup> for grain conditioning and flour homogenisation. It includes the following devices:

**5.5.1** Constant speed stirrer.

**5.5.2** Two worm screws integral with the flask, possibly via the stopper (one for wheat preparation, the other for flour homogenisation).

**5.5.3** Several wide-necked 2-litre plastic flasks.

**5.6 Test mill**<sup>3)</sup> (laboratory mill) manually operated (see Annex A).

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<sup>1)</sup> ITECMA “Securclean ER” is an example of a suitable product available commercially. This information is given for the convenience of users of this Technical Specification and does not constitute an endorsement by CEN of this this product.

<sup>2)</sup> The Chopin MR 2-litre rotary mixer is an example of a suitable product available commercially. This information is given for the convenience of users of this Technical Specification and does not constitute an endorsement by CEN of this this product.

<sup>3)</sup> The Chopin-Dubois CD1 test mill is an example of a suitable product available commercially. This information is given for the convenience of users of this Technical Specification and does not constitute an endorsement by CEN of this this product.