
**Pulps — Laboratory sheets —
Determination of physical properties**

*Pâtes — Feuilles de laboratoire — Détermination des propriétés
physiques*



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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).

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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 6, *Paper, board and pulps*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 172, *Pulp, paper and board*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 5270:2012), which has been technically revised.

The main changes are as follows:

- [6.2](#): rewriting of the subclause;
- [6.3](#): permission to perform optical tests on sheets formed using the Rapid-Köthen method if the sheets are dried at room temperature;
- [6.4](#): introduction of a minimum area for grammage determination;
- [7.2](#) inclusion of the option to report strain at break following determination of tensile properties;
- [7.5](#): inclusion of the option to determine air permeance using the Oken method.

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

This document provides the determination of physical properties of both low-grammage sheets and high-grammage sheets, prepared according to ISO 5269-1, ISO 5269-2 or ISO 5269-3. The oven-dry grammage of low-grammage sheets is (60 ± 2) g/m² using the conventional sheet former, as described in ISO 5269-1 and ISO 5269-3, or (75 ± 2) g/m² using the Rapid-Köthen sheet former, as described in ISO 5269-2 and ISO 5269-3. The oven-dry grammage of high-grammage sheets is 140 g/m², with a tolerance of 3 % using the conventional and the Rapid Köthen sheet formers, except for the z-directional tensile strength where the grammage is ≥ 90 g/m².

This document refers to the relevant International Standards for paper and board for the description and calibration of the required equipment, and for the calculation and reporting of results. This document, however, specifies the procedures for testing laboratory sheets where the amount of material is limited, compared to testing of paper and board to which the relevant International Standards referred to are applicable, and for that reason there can be a discrepancy in the procedures.

Pulps — Laboratory sheets — Determination of physical properties

1 Scope

This document specifies the relevant International Standards used for the determination of physical properties of laboratory sheets made of all types of pulps.

It is applicable to laboratory sheets prepared in accordance with ISO 5269-1, ISO 5269-2 or ISO 5269-3.

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.

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 534, *Paper and board — Determination of thickness, density and specific volume*

ISO 536, *Paper and board — Determination of grammage*

ISO 1924-2, *Paper and board — Determination of tensile properties — Part 2: Constant rate of elongation method (20 mm/min)*

ISO 1924-3, *Paper and board — Determination of tensile properties — Part 3: Constant rate of elongation method (100 mm/min)*

ISO 1974, *Paper — Determination of tearing resistance — Elmendorf method*

ISO 2470-1, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

ISO 2471, *Paper and board — Determination of opacity (paper backing) — Diffuse reflectance method*

ISO 2493-1, *Paper and board — Determination of bending resistance — Part 1: Constant rate of deflection*

ISO 2493-2, *Paper and board — Determination of resistance to bending — Part 2: Taber-type tester*

ISO 2758, *Paper — Determination of bursting strength*

ISO 5626, *Paper — Determination of folding endurance*

ISO 5636-3, *Paper and board — Determination of air permeance (medium range) — Part 3: Bendtsen method*

ISO 5636-4, *Paper and board — Determination of air permeance (medium range) — Part 4: Sheffield method*

ISO 5636-5, *Paper and board — Determination of air permeance (medium range) — Part 5: Gurley method*

ISO 5636-6, *Paper and board — Determination of air permeance (medium range) — Part 6: Oken method*

ISO 7263 (all parts), *Corrugating medium — Determination of the flat crush resistance after laboratory fluting*

ISO 9416, *Paper — Determination of light scattering and absorption coefficients (using Kubelka-Munk theory)*

ISO 9895, *Paper and board — Compressive strength — Short-span test*

ISO 11475, *Paper and board — Determination of CIE whiteness, D65/10 degrees (outdoor daylight)*

ISO 11476, *Paper and board — Determination of CIE whiteness, C/2° (indoor illumination conditions)*

ISO 12192, *Paper and board — Determination of compressive strength — Ring crush method*

ISO 15754, *Paper and board — Determination of z-directional tensile strength*

3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 Principle

Determination of physical properties of laboratory sheets using the procedure and equipment described in the relevant International Standards given in [Tables 1](#) and [2](#). The results are, if applicable, reported in index form.

5 Apparatus

The equipment shall be calibrated in accordance with the requirements in the relevant International Standards referred to in [Tables 1](#) and [2](#).

6 Trimmed laboratory sheets

6.1 Selection of laboratory sheets

Depending on the properties to be tested, determine the number of laboratory sheets required using [Table 1](#) and/or [Table 2](#) (these summarise test piece requirements). The properties measured shall be jointly determined by the pulp producer and the pulp user. The specification of the number of test pieces needed for each property defines the area required for testing and thus the number of sheets.

Each sheet shall be free of visible defects.

6.2 Conditioning of laboratory sheets

Condition the laboratory sheets in the standard atmosphere (23 ± 1) °C and (50 ± 2) % relative humidity, or in the atmosphere allowed in tropical countries, in accordance with ISO 187.

ISO 187 recommends that the equilibrium condition be attained by the sorptive process unless otherwise specified. For tests in which the hysteresis of the equilibrium moisture content can lead to errors that are significant, ISO 187 requires the sample to be pre-conditioned before conditioning unless it is known that conditioning will result in an equilibrium moisture content equivalent to that achieved by sorption or the samples have been prepared in accordance with ISO 5269-1.

If the laboratory sheets have been prepared using the conventional sheet former, according to ISO 5269-1 or ISO 5269-3, the sheets will reach equilibrium moisture content by desorption and shall