
**Tissue paper and tissue products —
Part 7:
Determination of optical properties**

Papier tissue et produits tissues —

Partie 7: Détermination des propriétés optiques

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 ISO 12625-7:2007

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 12625-7 was prepared by the European Committee for Standardization (CEN), Technical Committee CEN/TC 172, *Pulp, paper and board*, in collaboration with Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*, in accordance with the Agreement on technical co-operation between ISO and CEN (Vienna Agreement).

ISO 12625 consists of the following parts, under the general title *Tissue paper and tissue products*:

- *Part 1: General guidance on terms* [ISO 12625-7:2007](https://standards.iteh.ai/catalog/standards/sist/f2d7ddc9-2cf0-4691-ba92-54d1764cca40/iso-12625-7-2007)
- *Part 3: Determination of thickness, bulking thickness and apparent bulk density*
- *Part 4: Determination of tensile strength, stretch at break and tensile energy absorption*
- *Part 5: Determination of wet tensile strength*
- *Part 6: Determination of grammage*
- *Part 7: Determination of optical properties*
- *Part 8: Water-absorption time and water-absorption capacity, basket-immersion test method*
- *Part 9: Determination of ball burst strength*

Introduction

Optical measurements are affected by the geometry of the instruments used and by the texture of the material. The design of the instrument to be used according to this part of ISO 12625, and the routine to be adopted for its calibration, are specified in ISO 2469.

The optical properties are related to the visual appearance of the material. Therefore, although optical properties are intrinsic properties of tissue paper, they are not functional properties. It is recommended that agreement with respect to the properties to be measured is reached by the parties concerned, from case to case. If it is desired to achieve a match with products based on other materials, for example, between table napkins and candles, visual comparison may be essential.

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Tissue paper and tissue products —

Part 7: Determination of optical properties

1 Scope

This part of ISO 12625 specifies test methods for the instrumental determination of optical properties of tissue paper and tissue products. The various test methods that are available have been, or are being, developed as International Standards. They are listed and explained in Annex A.

This part of ISO 12625 also gives recommendations regarding relevant optical properties to be measured for different grades of tissue paper and tissue products and gives specific instructions for the preparation of test pieces (single-ply, multi-ply products) and for the optical measurements of creped products and embossed products, where special precautions may be necessary if the test-piece surfaces are uneven and if the materials are bulky, so that air is entrapped between the sheets.

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 186, *Paper and board — Sampling to determine average quality*

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

ISO 2469, *Paper, board and pulps — Measurement of diffuse reflectance factor*

ISO 2470:1999, *Paper and board — Measurement of diffuse blue reflectance factor (ISO brightness)*

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

ISO 5631, *Paper and board — Determination of colour (C/2°) — Diffuse reflectance method*

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 reflectance factor

R
ratio of the radiation reflected by a body to that reflected by the perfect reflecting diffuser under the same conditions of illumination and detection

NOTE 1 The reflectance factor is expressed as a percentage.

NOTE 2 The reflectance factor is influenced by the backing if the body is translucent.

3.2 diffuse reflectance factor

R
ratio of the reflection from a body to that reflected by the perfect reflecting diffuser under the same conditions of diffuse illumination and normal detection

NOTE The ratio is often expressed as a percentage.

3.3 intrinsic reflectance factor

R_{∞}
reflectance factor of a layer or pad of material thick enough to be opaque, i.e. such that increasing the thickness of the pad by doubling the number of sheets leads to no change in the measured reflectance factor

NOTE Adapted from ISO 2469:1994.

3.4 luminous reflectance factor

R_y
reflectance factor defined with reference to the CIE illuminant C, described in CIE Publication 15.2^[1] and the CIE 1931 colour-matching function $\bar{y}(\lambda)$ (described in ISO/CIE 10527^[2]), and corresponding to the attribute of visual perception of the reflecting surface

NOTE Adapted from ISO 2471:1998.

3.5 single-sheet luminous reflectance factor

R_0
luminous reflectance factor of a single sheet of paper with a black cavity as backing

[ISO 2471:1998]

3.6 diffuse blue reflectance factor ISO brightness

R_{457}
intrinsic reflectance factor measured with a reflectometer having the characteristics described in ISO 2469, Annex A, equipped with a filter or corresponding function having an effective wavelength of 457 nm and a width of 44 nm, described more fully by the weighting function factors given in Annex A and Table A.1 (in ISO 2470:1999), and adjusted so that the UV-content of the illumination incident upon the test piece corresponds to that of the CIE illuminant C

NOTE Adapted from ISO 2470:1999.

3.7**D65 brightness**

intrinsic reflectance factor measured at an effective wavelength of 457 nm under the conditions specified in ISO 2470 when the UV-content of the illumination has been adjusted as specified in ISO 11475 to conform to the D65 illuminant (referred to in ISO 2470)

3.8**CIE-whiteness (C/2°)** W

measure of whiteness derived from the CIE tristimulus values corresponding to the CIE standard illuminant C, described in CIE Publication 15.2^[1], and the CIE 1931 standard colorimetric observer, described in ISO/CIE 10527^[2], determined under the conditions specified in ISO 11476

3.9**CIE whiteness (D65/10°)** W_{10}

measure of whiteness derived from the CIE tristimulus values corresponding to the CIE standard illuminant D65, described in ISO 10526^[3] and the CIE 1964 supplementary standard colorimetric observer, described in ISO/CIE 10527^[2], determined under the conditions specified in ISO 11475 and expressed as whiteness units

3.10**colour (C/2°)**

L^* , a^* and b^* values of the sample according to the CIELAB 1976 system, corresponding to the CIE illuminant C, described in CIE Publication 15.2^[1] and the CIE 1931 standard colorimetric observer, described in ISO/CIE 10527^[2], determined by measurement under the conditions specified in ISO 5631

3.11**colour (D65/10°)**

L^* , a^* and b^* values of the sample according to the CIELAB 1976 system, corresponding to the CIE standard illuminant D65, described in ISO 10526^[3] and the CIE 1964 supplementary standard colorimetric observer, described in ISO/CIE 10527^[2], determined by measurement under the conditions analogous to those specified in ISO 5631

3.12**opacity (paper backing)**

ratio, expressed as a percentage, of the single-sheet luminous reflectance factor, R_0 , to the intrinsic luminous reflectance factor, R_∞ , of the same sample

[ISO 2471:1998]

4 Apparatus

4.1 Reflectometer, either a filter colorimeter or an abridged spectrophotometer, as specified in and calibrated according to ISO 2469.

Use the apparatus as specified in the relevant International Standard.

5 Sampling and conditioning

Unless otherwise agreed between the parties concerned, take samples in accordance with ISO 186 and condition them in accordance with ISO 187. Mark the samples for identification, and make sure that the two sides of the paper or of the product can be distinguished.

If testing is to be carried out on a sample as received, ensure that the test pieces taken are representative of this sample.