SLOVENSKI STANDARD
SIST EN 12625-7:2000

01-december-2000

Tissue papir in izdeki iz tissue papirja - 7. del: Določ evanje optič nih lastnosti

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

Tissue-Papier und Tissue-Produkte - Teil 7: Bestimmung von optischen Eigenschaften

Papier tissue et produits tissues - Partie 7: Détermination des propriétés optiques

Ta slovenski standard je istoveten z: **EN 12625-7:2000**

ICS:

85.080.20 Tissue papir Tissue paper

SIST EN 12625-7:2000 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12625-7

July 2000

ICS 85.080

English version

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

Papier tissue et produits tissues - Partie 7: Détermination des propriétés optiques

Tissue-Papier und Tissue-Produkte - Teil 7: Bestimmung von optischen Eigenschaften

This European Standard was approved by CEN on 5 July 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12625-7:2000 E

Content

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 172 "Pulp, paper and board", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

This Standard of the series EN 12625 contains the following parts:

- Part 2: Procedures for sampling and conditioning (currently available as a prENV)
- 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

The following Standards of this series are in preparation:

- Part 1: General guidance on terms
- Part ..: Water absorption sink time and water absorption capacity - Manual and automated test method

In addition, it is expressly stated, that the detection of impurities and contraries in tissue paper and tissue products should be applied according to the following European Standard:

- EN ISO 15755: Paper and board – Estimation of contraries (ISO 15755 :1999)

For the determination of moisture content in tissue paper and tissue products, EN 20287 should be applied.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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 European Standard 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 and these properties are not therefore regarded as functional properties of tissue paper. It is therefore 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 e.g. between table napkins and candles, visual comparison may be essential.

1 Scope

This part of EN 12625 specifies the test methods that shall be used for the instrumental determination of optical properties of tissue paper and tissue products.

It 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 pieces surfaces are uneven and if the materials are bulky so that air is entrapped between the sheets.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ENV 12625-2
Tissue paper and tissue products – Part 2: Procedures for sampling and conditioning

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

ISO 2471
Paper and board – Determination of opacity (paper backing) – Diffuse reflectance method

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

ISO 2470
Paper and board – Measurement of diffuse blue reflectance factor (ISO brightness)

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

ISO/DIS 11476
Paper and board – Determination of CIE whiteness (C/2°) in indoor illumination conditions

ISO 10526
CIE standard illuminants for colorimetry

ISO/CIE 10527
CIE standard colorimetric observers

3 Terms and definitions

For the purposes of this Standard, the following terms and definitions apply:

3.1 reflectance factor: ratio, expressed as a percentage, of the radiation reflected by a body to that reflected by the perfect reflecting diffuser under the same conditions (ISO 2469).

3.2 diffuse reflectance factor, *R*: the ratio, expressed as a percentage, of the radiation reflected by a body to that reflected by the perfect reflecting diffuser under the same conditions of diffuse illumination and normal viewing described in this International Standard in an instrument calibrated in accordance with the provisions of this standard (see ISO 2469).

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 results in no change in the measured reflectance factor (ISO 2469).

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 $\bar{y}$ (λ) (described in ISO/CIE 10527), and corresponding to the attribute of visual perception of the reflecting surface (see ISO 2471).

3.5 single-sheet luminous reflectance factor, R_o: luminous reflectance factor of a single sheet of paper with a black cavity as backing (ISO 2471).

3.6 diffuse blue reflectance factor, R_{457}, (ISO brightness): 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 at half height of 44 nm, described more fully by the weighting function factors given in Annex A and table 1 (in ISO 2470), and adjusted so that the UV-content of the illumination incident upon the test piece corresponds to that of the CIE-illuminant C (see ISO 2470).

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 (D65/10°), W_{10}: measure of whiteness derived from the CIE tristimulus values corresponding to the CIE standard illuminant D65, described in ISO 10526, and the CIE 1964 supplementary standard colometric observer, described in ISO/CIE 10527, determined under the conditions specified in ISO 11475 and expressed as whiteness units.

3.9 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, determined under the conditions specified in ISO/DIS 11476.

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, 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 and the CIE 1964 supplementary standard colorimetric observer, described in ISO/CIE 10527, 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_o, to the intrinsic luminous reflectance factor, R_∞ of the same sample (ISO 2471).

4 Apparatus

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

Use the apparatus as prescribed in the relevant ISO standard.

5 Sampling and conditioning

Take samples and condition the material in accordance with ENV 12625-2; unless otherwise agreed between the parties concerned. Mark the samples for identification, and make sure that the two sides of the paper or of the product can be distinguished.

6 Preparation of test pieces

Before preparing the test pieces, it may be necessary to consider whether measurements are to be made on a material or on a product. A single test piece may be a multi-ply item, even in the case of a material if it is produced as e.g. a two-ply sheet.

Avoiding watermarks, dirt and obvious defects of the sample, cut rectangular test pieces about 75 mm x 150 mm. Assemble not less than 20 pieces top side upwards in a pad using, if necessary, a number greater than 20 to ensure that the pad is opaque (see 3.3).

Protect the pad by placing a protecting sheet on both top and bottom. Avoid contamination and unnecessary exposure to light or heat. If the pads are very voluminous and bulky, steps shall be taken to expel the air. The pads should be carefully compressed between the protecting sheets.

Mark the pad in one corner to identify the sample and the marked side.

7 Procedure

7.1 General

Remove the protecting sheets from the pad of test pieces and measure the optical properties, on the marked side and on the reverse side, of the test pieces as described in the relevant subclause below.

Take the necessary steps, without damaging the material, to ensure that the pad is pressed against the measuring opening under sufficient pressure to give a compact pad which does not intrude into the measurement sphere.

NOTE: If necessary, a glass plate can be placed over the pad to ensure that it remains flat. If so, appropriate calibration procedures should be adopted and the use of the glass plate should be stated in the test report.

7.2 Measurement of brightness and whiteness (of white or near white materials)

Although ISO brightness, as described in ISO 2470, can be measured even if the tissue grade contains fluorescent dyestuff, this property should preferably be used to describe white non-fluorescent materials. CIE whiteness, as described in ISO 11475, should be measured in preference to ISO brightness if the tissue grade contains fluorescent whitening agents.

7.2.1 ISO brightness (diffuse blue reflectance factor)

Using the procedure described in ISO 2470, measure the ISO brightness (reflectance factor at an effective wavelength of 457 nm) of the marked side of the test piece pad. Read and record the value to the nearest 0,05 % reflectance factor or better. Move the uppermost test piece to the bottom of the pad and determine the reflectance factor for the next and similarly for the following test pieces until a total of not less than ten readings has been made.

If required, turn the test pad upside down and repeat the procedure on the other side. Calculate the ISO brightness as indicated in 8.1.

7.2.2 CIE whiteness, D65/10°

Remove the UV cut-off filter from the light beam. Operate and calibrate the apparatus as described in ISO 11475, with the UV-adjustment filter adjusted according to ISO 11475 so that the UV-content of the illumination matches the CIE standard illuminant D65, described in ISO 10526.

Without touching the test area, use the procedure appropriate to the instrument and determine the CIE whiteness of the marked side of the test piece pad. Read and record the value to the nearest whiteness unit and also the tint value. Move the uppermost test piece to the bottom of the pad and determine the whiteness value for the next and similarly for the following test pieces until a total of not less than ten readings has been made.

If required, turn the test pad upside down and repeat the procedure on the other side. Calculate the whiteness and tint values as indicated in 8.2.

If an assessment of the fluorescence component of the whiteness is required, place the specified UV cut-off filter in the light beam and measure the intrinsic radiance factor of each test piece without UV-excitation. Calculate the whiteness without UV-excitation as indicated in 8.2. Calculate the fluorescent component of the CIE whiteness as the difference between the two whiteness values measured with and without UV-excitation.

7.3 Measurement of colour

If the tissue grade contains no fluorescent dyestuff, colour (C/2°) shall be measured. ISO 5631 specifies the procedure according to the CIE 1931 standard colorimetric observer, described in ISO/CIE 10527, and the CIE illuminant C, described in CIE-Publication 15.2 [1].

If the tissue grade contains fluorescent whitening agents, colour (D65/10°) shall be measured. ISO 11475 specifies the procedure for adjusting the UV-content of the illumination reaching the test piece and the CIE standard illuminant D65, described in ISO 10526.

NOTE: There is no ISO/TC 6 standard for colour (D65/10°), but the equations are analogous to those given for colour (C/2°) in ISO 5631.

7.3.1 Colour (C/2°)

In the case of a filter instrument, check that the correct filters are inserted in the light beams.

Remove the protecting sheets from the pad of test pieces and either measure the R_x, R_y and R_z values or read and record the reflectance factor values and determine the X, Y and Z tristimulus values for the marked side of the top test piece. Record the results to the nearest 0,05 unit or better, move the uppermost test piece to the bottom of the pad and repeat the measurement for the next; proceed in this way until at least ten readings have been made. Invert the pad and repeat the procedure for the other side. Calculate the colour as indicated in 8.3.