



# SLOVENSKI STANDARD

SIST EN 648:2007

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Paper and board intended to come into contact with foodstuffs - Determination of the fastness of fluorescent whitened paper and board

Papier und Pappe vorgesehen für den Kontakt mit Lebensmitteln - Bestimmung der Farbechtheit von optisch aufgehelltem Papier und Pappe

(standards.iteh.ai)

Papier et carton destinés a entrer en contact avec les denrées alimentaires - Détermination de la solidité du papier et du carton blanchis par des agents d'azurage fluorescents

<https://standards.iteh.ai/catalog/standards/sist/fe20125b-dd54-4a6e-9b30-396c72bd04eb/sist-en-648-2007>

Ta slovenski standard je istoveten z: EN 648:2006

## ICS:

67.250	Materiali in predmeti v stiku z živil	Materials and articles in contact with foodstuffs
85.060	Papir, karton in lepenka	Paper and board

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English Version

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board

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This European Standard was approved by CEN on 24 August 2006.

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.

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## Foreword

This document (EN 648:2006) 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of an identical text or by endorsement, at the latest by March 2007, and conflicting national standards shall be withdrawn at the latest by March 2007.

This document supersedes EN 648:2003.

With regard to EN 648:2003 the following changes has been made:

- a) the test fluid "sodium carbonate solution" has been omitted and the test fluid "saliva stimulant" has been introduced to cover a demand..
- b) editorial changes

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom. (standards.iteh.ai)

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## 1 Scope

This document specifies procedures for the testing of the fastness of fluorescent whitened paper and board intended to come into contact with foodstuffs. Two procedures are given, procedure A for contact of long duration (e. g. food packaging) and procedure B, for contact of short duration (e. g. napkins, kitchen papers, household papers).

## 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.

EN ISO 186, *Paper and board — Sampling to determine average quality (ISO 186:2002)*

ISO 8787, *Paper and board — Determination of capillary rise — Klemm method*

## 3 Terms and definitions

For the purposes of this document, the following term and definition applies.

### 3.1 fastness

ineffective transfer of fluorescent whitening agent from paper, to a glass fibre paper saturated with a test fluid and evaluated visually under UV-light against a series of comparison papers

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## 4 Principle

A sample is brought into contact with glass fibre papers which have been saturated with a test fluid and placed under load for a given time. The staining of the glass fibre paper is evaluated by comparison with a series of fluorescent whitened comparison papers. The test fluids used are distilled or deionised water, dilute acetic acid, saliva simulant and olive oil depending on the type of food contact expected.

## 5 Materials and equipment

5.1 Unstained glass fibre papers of 60 mm × 90 mm. The glass fibre papers shall meet the following conditions:

- a) grammage of 70 g/m<sup>2</sup>;
- b) capillary rise of 190 mm to 210 mm in 10 min in accordance with ISO 8787;
- c) free from fluorescent whitening and wet strength agents;
- d) free from cellulosic fibres.

5.2 Glass fibre papers with a diameter of 30 mm. The glass fibre papers shall meet the same conditions as in 5.1.

5.3 Watch glass dish with a diameter of 40 mm.

5.4 Glass plates, 60 mm × 90 mm.

- 5.5 Polyethylene film, uncoloured and transparent.
- 5.6 Weight having a mass of 1 kg.
- 5.7 UV lamp giving UV-A (365 nm).

## 6 Reagents

6.1 Fluorescent whitening agents (FWAs) with Constitution No. 40622 in accordance with Colour Index II, 1956 Edition (The Society of Dyers & Colorists, P.O. Box 244, Perkin House, 82 Grattan Road, Bradford BDJ 2 JB, West Yorkshire). An aqueous solution of this whitening agent shall exhibit the following absorbency.

Absorbency (0,350 ± 0,01) or (0,420 ± 0,01)

Wave length 365 nm resp. 350 nm

Path length 1 cm

Test solution 10 mg FWAs in 1 l water (6.2)

Measurement against water (6.2)

Deviation of this absorbency makes adjustment of the amount of fluorescent whitening agent used in 11.1 necessary. The correction shall be made in line with the absorbency found.

6.2 Distilled or deionised water.

6.3 Aqueous acetic acid 3 % (m/v).

6.4 Saliva simulant (5 g/l).

6.4.1 Composition of the simulated saliva with a pH of 6,8 +/- 0,1

Reagents	Mass fraction g/l
Magnesium chloride (MgCl <sub>2</sub> ·6H <sub>2</sub> O)	0.17
Calcium chloride (CaCl <sub>2</sub> ·2H <sub>2</sub> O)	0.15
Dipotassium hydrogen phosphate (K <sub>2</sub> HPO <sub>4</sub> ·2H <sub>2</sub> O)	0.76
Potassium carbonate (K <sub>2</sub> CO <sub>3</sub> )	0.53
Sodium chloride (NaCl)	0.33
Potassium chloride (KCl)	0.75
Hydrochloric acid (1%, mass fraction)	Added until pH value equals 6.8 ± 0.1

6.4.2 Production of simulated saliva

Dissolve the potassium and sodium salts in approx. 900 ml water. Then add the calcium chloride and magnesium chloride and stir until all added reagents have dissolved completely. Calibrate the pH meter with a buffer solution as stipulated by the manufacturer. Then immerse the pH electrode into the solution, stir briefly and add hydrochloric acid until a constant pH of 6.8 ± 0.1 has been obtained. Transfer the solution to a 1000 ml volumetric flask and fill to the mark with water. Store protected from light and make sure that the pH of the simulated saliva is in the 6.8 ± 0.1 range prior to use.

NOTE If the simulated saliva is to be kept longer than 2 weeks, it is advisable to use water that has been boiled for 10 minutes.

**6.5** Rectified olive oil, characterised as follows:

— iodine value (Wijs)	80 to 88
— refractive index at 25° C	1,4 665 to 1,4 679
— acidity (expressed as % oleic acid)	maximum 0,5 %
— peroxide number (expressed as oxygen milli-equivalents per kg oil)	maximum 10

**7 Sampling**

Sampling shall be carried out in accordance with EN ISO 186.

**8 Preparation of sample**

Cut or punch several test pieces of 50 mm × 20 mm from the sample under investigation. Smooth edges shall be obtained.

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**9 Procedure A (long duration contact)**

9.1 Immerse two sheets of glass fibre paper (5.1) in a test fluid (6.2, 6.3, 6.4 or 6.5). Remove the sheets after saturation and free the sheets from excess fluid by wiping them on the rim of the container.

9.2 Place one sheet of glass fibre paper with its smooth side upwards on the glass plate (5.4). Place the test piece (8) immediately on top and cover it with the second saturated sheet of glass fibre paper so that the smooth side of the glass fibre paper is in contact with the test piece again. Place a second glass plate (5.4) on top, wrap the total assembly in polyethylene film (5.5) to prevent the edges from drying out, load it with a mass of 1 kg (5.6) and allow it to stand for 24 h at  $(23 \pm 2)^\circ \text{C}$  with protection against direct light penetration.

9.3 If test pieces of a grammage  $> 140 \text{ g/m}^2$  are to be investigated, an appropriate even number of glass fibre paper layers (5.1) is used so that the total of their grammages just exceeds the grammage of the test piece.

Construct the assembly as described in 9.2, with each glass fibre paper being individually saturated and wiped and arranged in such a way that the same number of glass fibre papers are in contact with both sides of the test piece.

9.4 After 24 h open the assembly. Place the glass fibre papers on 3 adjacent glass rods,  $\varnothing 8 \text{ mm}$  to  $\varnothing 10 \text{ mm}$ , with the side which was in contact with the test piece upwards, cover them without contact to prevent light penetration and air-dry at ambient temperature. Glass fibre papers saturated with olive oil are not dried.

**10 Procedure B (short time contact)**

10.1 Immerse two sheets of unstained glass fibre papers (5.1) in a test fluid (6.2, 6.3, 6.4 or 6.5). Remove the sheets after saturation and free the sheets from excess fluid by wiping them on the rim of the container.

10.2 Place one sheet of unstained glass fibre paper with its smooth side upwards on the glass plate (5.4). Place the test piece (8) immediately on top and cover it with the second saturated sheet of glass fibre paper



so that the smooth side of the glass fibre paper is in contact with the test piece again. Place a second glass plate (5.4) on top, wrap the total assembly in polyethylene film (5.5) to prevent the edges from drying out, load it with a mass of 1 kg (5.6) and allow it to stand for 10 min at  $(23 \pm 2)^\circ \text{C}$  with protection against direct light penetration.

**10.3** If test pieces of a grammage  $> 140 \text{ g/m}^2$  are to be investigated, an appropriate even number of glass fibre paper layers (5.1) is used so that the total of their grammages just exceeds the grammage of the test piece.

Construct the assembly as described in 9.2, with each glass fibre paper being individually saturated and wiped, and arranged in such a way that the same number of unstained glass fibre papers are in contact with both sides of the test piece.

**10.4** After 10 min open the assembly. Place the glass fibre papers on 3 adjacent glass rods,  $\varnothing 8 \text{ mm}$  to  $\varnothing 10 \text{ mm}$ , with the side which was in contact with the test piece upwards, cover them without contact to prevent light penetration and air-dry at ambient temperature. Glass fibre papers saturated with olive oil are not dried.

## 11 Comparison papers

### 11.1 Solutions for comparison papers

Prepare the following stock solution (1000 mg/l).

Dissolve 1 g of fluorescent whitening agent (6.1) in 800 ml distilled or deionised water (6.2) and make up to 1 l. Using this stock solution, prepare the following standard concentrations.

**Table 1 – Standard concentrations for stock solutions**

Evaluation grade	FWA solution	FWA mg/l
1	125 ml stock solution diluted to 1 l	125
2	31 ml stock solution diluted to 1 l	31
3	8 ml stock solution diluted to 1 l	8
4	3 ml stock solution diluted to 1 l	3

The stock solutions and the dilutions shall always be freshly prepared.

### 11.2 Preparation of fluorescent whitened comparison papers

Glass fibre papers (5.1 and 5.2) are used as comparison papers and are treated as follows:

Cut out round samples with a diameter of 30 mm from the glass fibre paper. Apply 100  $\mu\text{l}$  standard liquid of the defined concentration on a watch glass dish with a diameter of 40 mm (5.3). Put the round sample of the glass fibre paper on the watch glass dish with the standard liquid and distribute the standard liquid equally into the glass fibre paper (e. g. using a stamp). Put the accordingly prepared round sample on the normal glass fibre paper of 90 mm  $\times$  60 mm. Air dry the accordingly prepared reference papers in the dark and mark them with the number of the evaluation grade which corresponds to the FWA solution.