



# SLOVENSKI STANDARD SIST EN ISO 5350-1:2000

01-april-2000

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Pulp - Estimation of dirt and shives - Part 1: Inspection of laboratory sheets (ISO 5350-1:1998)

Faserstoff - Schätzung von Schmutz und Splittern - Teil 1: Prüfung von Laborblättern (ISO 5350-1:1998)

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Pâtes - Estimation des impuretés et buchettes - Partie 1: Examen des feuilles de laboratoire (ISO 5350-1:1998)

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**Ta slovenski standard je istoveten z: EN ISO 5350-1:1998**

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## **ICS:**

85.060

Papir, karton in lepenka

Paper and board

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**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN ISO 5350-1

August 1998

ICS 85.040

Descriptors: paper pulps, sheets, impurities, determination

English version

Pulp - Estimation of dirt and shives - Part 1: Inspection of  
laboratory sheets (ISO 5350-1:1998)

Pâtes - Estimation des impuretés et bûchettes - Partie 1:  
Examen des feuilles de laboratoire (ISO 5350-1:1998)

Faserstoff - Schätzung von Schmutz und Splittern - Teil 1:  
Prüfung von Laborblättern (ISO 5350-1:1998)

This European Standard was approved by CEN on 10 April 1998.

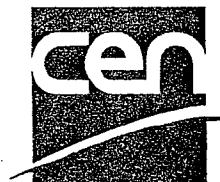
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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same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

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## Foreword

The text of EN ISO 5350-1:1998 has been prepared by Technical Committee CEN/TC 172 "Pulp, paper and board", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 6 "Paper, board and pulps".

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of an identical text or by endorsement, at the latest by January 1999, and conflicting national standards shall be withdrawn at the latest by January 1999.

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.

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## Introduction

This European Standard is based on visual inspection, and a normative Annex C is added where the inspection is performed using instrumental devices. This is justified by the present state of instrumental development. For the time being, the visual inspection is the main part of this European Standard and the instrumental procedure forms an Annex C. This will eventually be changed when more experience with instrumental devices is gained and it has been shown that such equipment can estimate dirt and shives to an acceptable level of precision at least equal to visual inspection.

Annex C is applicable to pulps with high dirt counts.

## 1 Scope

This Part of EN ISO 5350 specifies the method for the estimation by transmitted light of the visible dirt and shives in laboratory sheets prepared from pulp. It is applicable to all kinds of pulp, though it is mainly intended for pulp that is not manufactured in sheet form.

Part 2 of this European Standard deals with the estimation of dirt and shives in mill sheeted pulp.

This part can also be applied to mill sheeted pulp if the sheets have high grammage or are very opaque for other reasons, in which case Part 2 is not applicable.

This European Standard is not intended for recycled pulp.

For inspection of pulp with a high dirt count the procedure described in Annex C shall be applied.

NOTE: Shives in mechanical pulp are usually determined by means based on screening or optical analyses. Some grades of mechanical pulps can cause problems in sheet-making or inspection, which makes this European Standard impractical.

## 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.

EN ISO 5350-2

Pulp – Estimation of dirt and shives – Part 2: Inspection of mill sheeted pulp (ISO 5350-2 : 1998)

EN 20638

Pulps – Determination of dry matter content (ISO 638 : 1978)

EN 27213

Pulps – Sampling for testing (ISO 7213 : 1981)

EN ISO 5263

Pulp – Laboratory wet disintegration (ISO 5263 : 1995)

ISO/DIS 5269-1

Pulps – Preparation of laboratory sheets for physical testing – Part 1: Conventional sheet-former method (Revision of ISO 5269-1:1979)

ISO/DIS 5269-2

Pulps – Preparation of laboratory sheets for physical testing – Part 2: Rapid Köthen-method (Revision of ISO 5269-2:1980)

## 3 Definitions

For the purposes of this European Standard, the following definitions apply:

**3.1 contrary (in pulp):** any unwanted particle, of specified minimum size and having a contrasting opacity with respect to the surrounding area of the sheet, according to the comparison chart given in Annex A.

**3.1.1 dirt:** any non-fibrous contrary.

**3.1.2 shive:** sliver of wood, or fibre bundle.

## 4 Principle

Laboratory sheets, formed from disintegrated pulp, are inspected in transmitted light. The area of all contraries larger than a specified value and showing contrasting opacity with respect to the surrounding area of the sheet according to the comparison chart presented in Annex A are estimated. The estimated areas are added and the total area of dirt and shives is reported as square millimetre per kilogram of oven-dry pulp (mm<sup>2</sup>/kg).

NOTE: If required, the areas of dirt and shives in different size classes can also be reported.

## 5 Apparatus

**5.1 Viewing table** with an illumination device suitable for inspecting the laboratory sheets in transmitted artificial daylight. The luminance as measured at the surface of the viewing table, shall be 2500 cd/m<sup>2</sup> to 3000 cd/m<sup>2</sup>. Daylight or direct light from any external source should be avoided.

NOTE: The luminance can be measured by a luminance meter.

**5.2 Comparison chart:** A film with a series of black and grey spots of different shapes, areas and contrasts. This shall be used for visual inspection or for calibration of an instrumental device. The chart is included in Annex A of this European Standard.

Do not use the illustration in Annex A, or any copy thereof in any inspection, because reproduction may change the size and the contrast of the spots.

### 5.3 Preparation of laboratory sheets

#### 5.3.1 General

Care shall be taken to avoid contamination of the pulp during the test. It is necessary to ensure that the surface and the elements of the desintegrator and sheet-making equipment are clean and free from corrosion and deposits. Make sure that the water to be used is free from foreign particles; if necessary filter the water.

**5.3.2 Disintegrator** as specified in EN ISO 5263.

**5.3.3 Sheet-making equipment** as specified in ISO/DIS 5269-1 or ISO/DIS 5269-2.

**5.3.4 Blotters of a size corresponding to the sheet-making apparatus.**

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## 6 Preparation of sample

### 6.1 Sampling

If the dirt count is to represent the dirt in a lot of pulp, the number of sheets to be inspected and the method of taking them shall be in accordance with EN 27213.

The total mass of a sample shall be at least 180 g as oven-dry.

As 100 g of pulp is required for the inspection, two batches of 60 g each shall be prepared (see EN ISO 5263). A sample of 180 g provides the possibility to make a preliminary test as described in 6.2.

### 6.2 Pretreatment of the sample

The sample shall be soaked in accordance with the procedure stated in EN ISO 5263.

Prepare two batches of disintegrated pulp according to the procedure given below:

Add water until the consistency is 60 g of oven-dry pulp per 2700 ml of water. Disintegrate the sample in the disintegrator. Choose the number of revolutions so that extensive disintegration is avoided, but all lumps of fibres have disappeared. It is advisable to make some preliminary tests to establish the number of revolutions needed. Table 1 gives an indication of the number of revolutions found appropriate for some grades of dry pulp.

Combine the two batches.

Table 1: Recommended values for the number of revolutions, the grammage (as oven-dry) and minimum number of laboratory sheets

pulp qualities	number of revolutions	grammage g/m <sup>2</sup>	number of sheets	
			conventional sheet- former	Rapid Köthen sheet- former
flash dried bleached chemical pulp	10000	≈ 700	6	5
mechanical pulp, dry	6000 <sup>1)</sup>	≈ 150	25	22
unbleached, kraft pulp, dry	8000	≈ 80	47	40

<sup>1)</sup> For some grades as much as 12000 revolutions is needed for complete disintegration.

It is very time consuming to examine pulp with a very high dirt count, so if it is found by a preliminary test that the number of contraries exceeds 300 per kilogram of oven-dry pulp, the amount to be inspected can be reduced to 50 g of oven-dry pulp. This shall be reported with the result.

### 6.3 Sheet making

Prepare a number of sheets in the sheet-making apparatus. The number of sheets and their grammage shall correspond to at least 100 g of oven-dry pulp. Table 1 gives the recommended grammages and the minimum number of sheets to be inspected for some pulp qualities. Mark the top sides of the sheets. Press the sheets at about 400 kPa. A final dry matter content of about 30 % is recommended. However, dry sheets may be used if they are transparent enough to ensure that all contraries are visible, but the use of dry sheets shall be reported together with the result.

NOTE 1: The sheets can dry out if inspection is not made immediately after sheet-making. This can be avoided by covering the sheets with a sheet of plastic until used. If the sheets become too dry, they may be rewetted by the use of a hand spray or an atomizer.

NOTE 2: It is recommended to ensure that all contraries are visible by marking a small spot at the surface of the sheet, and checking the visibility of this spot when viewing the sheet from the other side.

## 7 Procedure

### 7.1 Examination

Examine the laboratory sheets visually using the viewing table. Examine half of the sheets produced from the topside, and the other half from the wire side. Use the comparison chart in Annex A as an aid. Only contraries having an area of  $\geq 0,04$  mm<sup>2</sup> shall be noted. Size class 5 can be deleted, if agreed upon.

Classify the contraries according to their area. Distinguish between dirt and shives if required.

### 7.2 Determination of dry matter

Carry out the determination of the amount of dry matter of the inspected sheets by drying the sheets in accordance with EN 20638.



## 8 Expression of results

### 8.1 Calculation

For all contraries (or separately for dirt and shives) calculate the total area, or the area in each size class according to the formula:

$$X = \sum \frac{c_i \cdot n_i}{b} \quad (1)$$

where

- $X$  is the total area of contraries (or of the contraries in each class), expressed in square millimetre per kilogram ( $\text{mm}^2/\text{kg}$ ) of oven-dry pulp;
- $c_i$  is the logarithmic mean area of each class, indicated in table 2, expressed in square millimetre ( $\text{mm}^2$ );
- $n_i$  is the number of contraries in the class;
- $b$  is the oven-dry mass of the test pieces, expressed in kilogram (kg).

The logarithmic mean areas are given in table 2.

For contraries exceeding  $5 \text{ mm}^2$   $c_i \cdot n_i$  is replaced by the contraries' true areas, which shall be evaluated separately for each contrary and stated in the report.

NOTE: The logarithmic mean area of a class is justified, as there is a tendency towards enrichment of contraries towards the lower limit of the class.

#### EXAMPLE

If 8 contraries are counted within the size class 0,15 to 0,39, their area  $c_i \cdot n_i$  is calculated as follows:

$$8 \times 0,242 \text{ mm}^2 \approx 1,9 \text{ mm}^2$$

### 8.2 Results

Report the total area of contraries to the nearest integer. Results below  $5 \text{ mm}^2/\text{kg}$  shall be reported to one decimal place.

NOTE: On request, the result can be expressed separately for each size class, or separately for dirt and shives. However, if the count is reported by categories, the categories containing few contraries will be subject to much higher sampling uncertainty.

### 8.3 Precision

Exact figures for repeatability and reproducibility of this European Standard cannot be stated. The results from some investigations are presented in Annex B.

## 9 Test report

The test report shall refer to this European Standard and state:

- a) all information necessary for complete identification of the sample or lot;
- b) the result expressed in square millimetre of contraries per kilogram of oven-dry pulp. On request, the result can be divided into classes according to size or nature, i.e. dirt or shives;
- c) information whether the result is based on visual inspection or instrumental procedure;
- d) the number of revolution used in the disintegration and the grammage of the laboratory sheets;
- e) the mass of pulp inspected in grams;
- f) the sheet making procedure used;
- g) any departure from this European Standard, or any circumstances regarded as optional that may have affected the result.