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International Standard **ISO** 5350/1

Pulps — Estimation of dirt and shives — Part 1 : Unbleached chemical pulps

Pâtes — Estimation des impuretés et bûchettes — Partie 1 : Pâtes écrues

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 5350/1 was developed by Technical Committee ISO/TC 6, *Paper, board and pulps*, and was circulated to the member bodies in January 1981.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Poland
Austria	India	Romania
Belgium	Iran	South Africa, Rep. of
Bulgaria	Italy	Spain
Canada	Kenya	Sweden
China	Korea, Dem. P. Rep. of	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Finland	Netherlands	United Kingdom
France	New Zealand	
Germany, F. R.	Norway	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Chile
USA

Pulps — Estimation of dirt and shives — Part 1 : Unbleached chemical pulps

1 Scope and field of application

This part of ISO 5350 specifies a method for estimation of the visible dirt and shives in pulp.

Although in principle this method is applicable to all kinds of pulp, it is in practice not suitable for estimation of the dirt and shives in fully bleached and mechanical pulps.

2 References

ISO 638, *Pulps — Determination of dry matter content.*

ISO 5263, *Pulps — Laboratory wet disintegration.*

ISO 5269/1, *Pulps — Preparation of laboratory sheets for physical testing — Part 1 : Conventional sheet-former method.*

ISO 5725, *Precision of test methods — Determination of repeatability and reproducibility by inter-laboratory tests.*

ISO 7213, *Pulps — Sampling for testing.*

3 Definitions

For the purpose of this International Standard, the following definitions apply :

3.1 dirt : Any non-fibrous material which is embedded in the sheet, and which has a markedly contrasting opacity or colour with respect to the rest of the sheet on being viewed by reflected light.

3.2 shive : Sliver of wood, or fibre bundle which appears to be almost opaque, or which has a colour in contrast with the rest of the sheet on being viewed by reflected light.

4 Principle

Laboratory sheets, formed from disintegrated pulp, are impregnated with a liquid having a refractive index close to that of cellulose, and all dirt and shives of specified sizes are counted by reflected light.

5 Apparatus and auxiliary materials

Distilled or deionized and filtered water, free from suspended particles, shall be used throughout the test.

Ordinary laboratory equipment and

5.1 Sheet-making equipment.

The recommended sheet-making equipment and procedure shall comply with the requirements of ISO 5269/1. Sheets can also be formed on a device such as that illustrated in annex A, but it must be recognized that the results obtained by the two methods of sheet forming may be different.

5.2 Blotters, free from visible contraries and surface dirt or fibre, for protection of the test sheets.

5.3 An illumination device, with suitable arrangements for investigation of the test sheets viewed in reflected light against a white background, provided with a ruled or squared grid to facilitate scanning of the test sheets (for an example, see annex B).

5.4 Dirt comparison chart, comprising a series of shapes of different areas photographed onto a transparent film. The shapes are arranged such that, in one direction, there is a sequence of different shapes with the same area, whilst in the direction at right angles, there is a graded series of different, known areas of similar shape.

The chart is illustrated and a copy enclosed in annex C.

5.5 Impregnation liquid, with a refractive index of approximately 1,5.

NOTE — Low boiling liquids which give off toxic vapours shall not be used. Olive oil and liquid paraffin are examples of suitable impregnation liquids.

5.6 Means for impregnation of the test sheets without damaging the surface, such as a rubber roller or a small brush.

6 Preparation of test sheets

6.1 Sampling

The sample to be used for preparation of the test sheets shall be as representative as possible. The amount of pulp available for testing shall be stated in the test report.

The quantity of pulp required for the test shall be sufficient for at least five test sheets. However, a minimum of 24 g (oven-dry basis) of pulp shall be available for standard disintegration according to ISO 5263.

Take samples according to ISO 7213.

6.2 Pretreatment of pulp

Disintegrate the pulp as described in ISO 5263. By means of suitable sheet making equipment (5.1), prepare from the disintegrated stock five test sheets with a grammage of 60 ± 3 g/m², and an area of about 200 cm² or a $1,2 \pm 0,06$ g sheet (see the note). Leave the sheets to dry, each between protecting blotters (5.2).

NOTE — Care should be taken to avoid contamination of the pulp during the test. It is necessary to ensure that the surfaces and the elements of the disintegrator and sheet-making equipment are clean, and free from corrosion and deposits.

7 Procedure

Remove the protecting blotters, and impregnate the test sheets with the impregnation liquid (5.5), by means of a roller or a brush (5.6). Count the number of specks in the impregnated test sheets, both within the sheets and on the surfaces, by reflected light. Estimate the surface area of the impurities by comparison with the specks of a known area indicated on the dirt comparison chart (5.4). Count the dirt and shives separately, and classify them in groups in accordance with their areas as follows :

Group	Area mm²
1	> 5,00
2	1,00 to 4,99
3	0,40 to 0,99
4	0,15 to 0,39

Count :

a) groups 1 to 4 for test sheets made from unbleached chemical pulps;

b) groups 1 to 3 for test sheets made from semichemical pulps.

If the total number of specks in the test sheets is two or less the values should be interpreted with caution (see clause 1).

8 Calculation and reporting

Calculate the dirt and shives content by the formula

$$X = \frac{a}{m} \times 10$$

where

X is the dirt and shives content, expressed in 100 specks per kilogram of pulp;

a is the total number of specks of dirt or shives in the classified group, in the five sheets;

m is the total dry mass, expressed in grams, of the five sheets tested.

Report separately the contents of dirt and shives, classified in groups in accordance with clause 7 and to the following degrees of precision :

a) if X is less than 30, to the nearest 1 unit;

b) if X is more than 30, to the nearest 5 units;

c) if X exceeds 500, as "more than 500".

9 Precision

The main source of error is the uneven distribution of the specks quantitatively and qualitatively, between separate laboratory sheets within the same sample. The precision of a dirt count, expressed as the coefficient of variation in the total number of specks, is about 11 % when the determination is made with five sheets. On this basis, the repeatability, according to ISO 5725, is about 30 %.

10 Test report

The test report shall include the following particulars :

a) all the information necessary for complete identification of the sample;

b) reference to this International Standard;

c) the amount of pulp available for testing;

d) the results obtained expressed in 100's of specks per kilogram of pulp;

e) the sheet making procedure used;

f) the impregnation liquid;

g) the number of test sheets;

h) any particular points observed in the course of the test;

j) any departure from this International Standard, or any circumstances or influences regarded as optional that may have affected the results.

Annex A

Example of a simple sheet-making device (5.1)
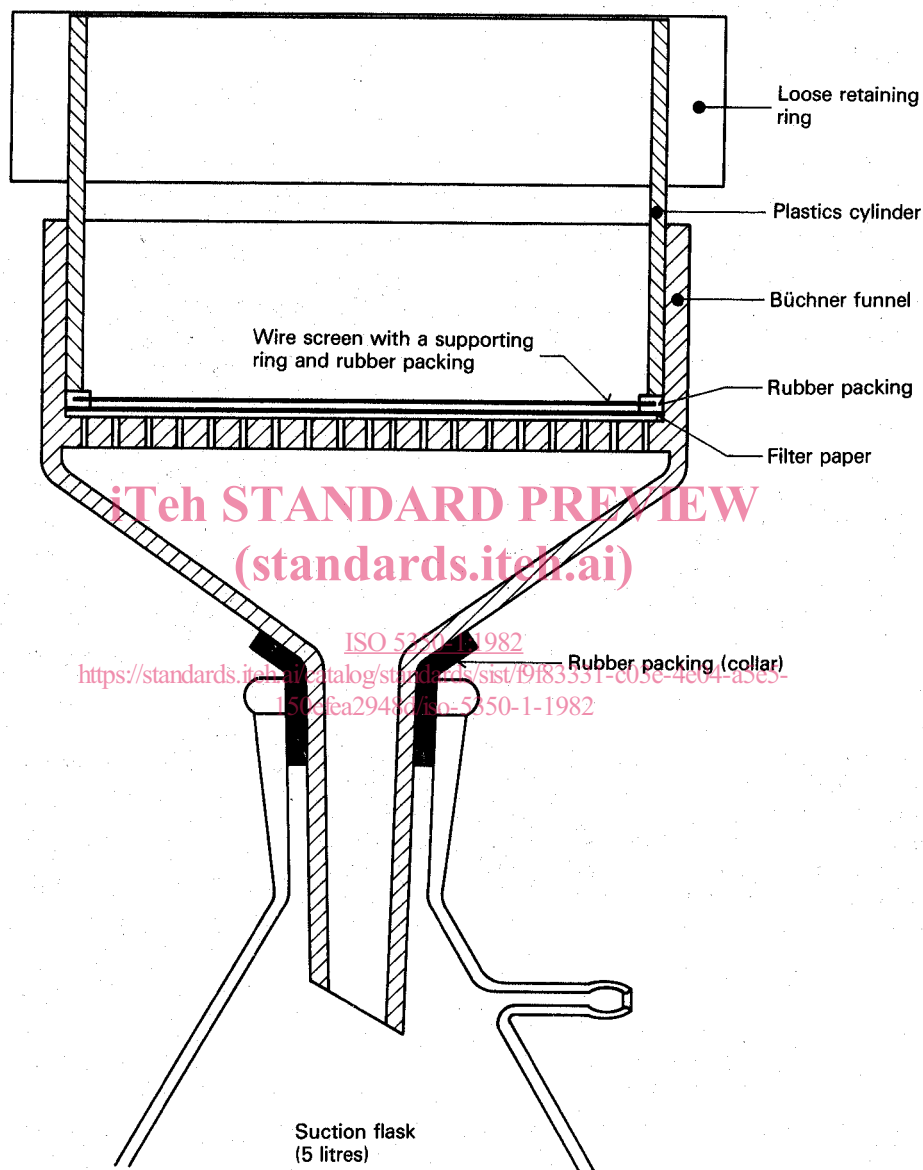
(This annex forms part of the standard.)

Loose retaining ring

Plastics cylinder

Büchner funnel

Wire screen with a supporting ring and rubber packing

Rubber packing

Filter paper

Rubber packing (collar)

Suction flask (5 litres)

Figure 1

Annex B

Example of a suitable illumination device (5.3)

(This annex forms part of the standard.)

A suitable illumination device, as shown in figure 2, consists of a white background, and a floating arm magnifier with circular fluorescent lighting.

If the specks are examined under magnification, the dirt comparison chart (5.4) shall also be viewed under magnification.
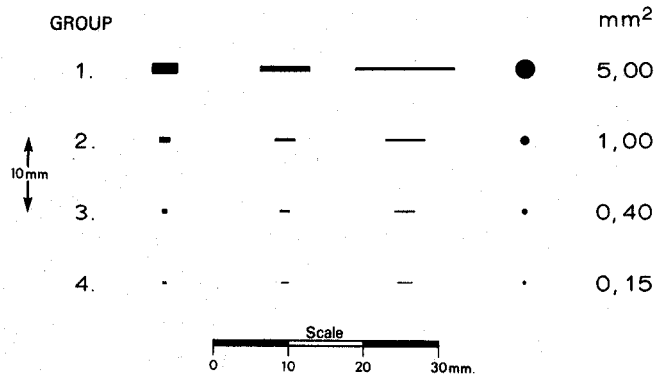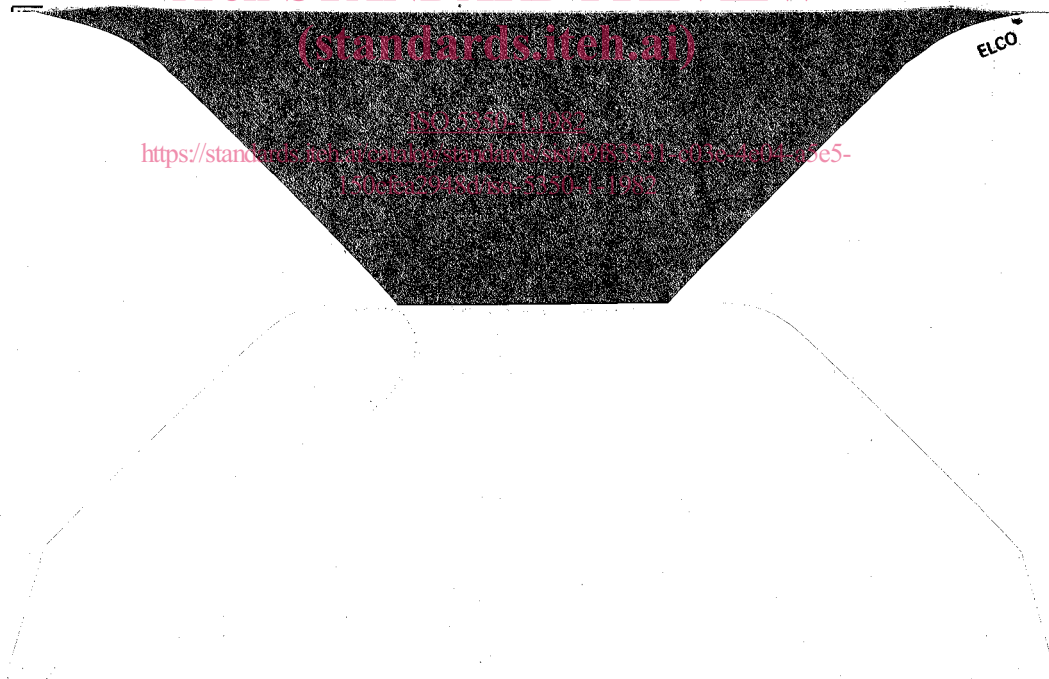

Figure 2

Annex C

Dirt comparison chart * (5.4)

(This annex forms part of the standard.)

GROUP					mm^2
1.	▬	━	───	●	5,00
2.	▪	—	—	•	1,00
3.	▪	–	—	•	0,40
4.	·	–	—	·	0,15

10 mm

Scale

0   10   20   30 mm.

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* Additional copies are available from the Sales Department, ISO Central Secretariat, 1, rue de Varembé, CH-1211 Geneva 20.