
**Pulps — Estimation of dirt and shives —
Part 2:
Inspection of mill sheeted pulp by
transmitted light**

*Pâtes — Estimation des impuretés et bûchettes —
Partie 2: Examen des pâtes en feuilles par lumière transmise*
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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 5350-2 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 5, *Test methods and quality specifications for pulps*.

This third edition cancels and replaces the second edition (ISO 5350-2:1998, ISO 5350-2:1998/Cor.1:1999), which has been technically revised.

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With regard to ISO 5350-2:1998 and Technical Corrigendum 1:1999, the following changes have been made:

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- [ISO 5350-2:2006](https://standards.iteh.ai/catalog/standards/sist/8247d854-9d2a-43f2-84d2-c2545cf04b37/iso-5350-2-2006)
- a note for problems concerning thick sheets has been added to the scope,
 - a more precise description of the instrumental procedure in informative Annex B was given;
 - editorial updating.

ISO 5350 consists of the following parts, under the general title *Pulps — Estimation of dirt and shives*:

- *Part 1: Inspection of laboratory sheets by transmitted light*
- *Part 2: Inspection of mill sheeted pulp by transmitted light*
- *Part 3: Visual inspection by reflected light using Equivalent Black Area (EBA) method*
- *Part 4: Instrumental inspection by reflected light using Equivalent Black Area (EBA) method*

Introduction

This part of ISO 5350 is based upon visual inspection. Informative Annex B is used when the inspection is performed by instrumental devices. For the time being, though, visual inspection provides the basis for this part of ISO 5350. 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.

Estimation of dirt and shives by a visual technique is a well-established method in the pulp and paper industry, and the estimation of these contraries is important for trade purposes.

This part of ISO 5350 is complementary to ISO 5350-1, which concerns visual inspection of laboratory sheets by transmitted light, and ISO 5350-3, which concerns visual inspection by reflected light.

ISO 5350-4 is based on automatic inspection by reflected light.

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Pulps — Estimation of dirt and shives —

Part 2: Inspection of mill sheeted pulp by transmitted light

1 Scope

This part of ISO 5350 specifies a method for the estimation by transmitted light of the visible dirt and shives in pulp manufactured in sheets.

It does not apply to unbleached kraft pulps or to any other sheeted pulps that are too opaque to allow for the estimation of the minimum size or for minimum contrast specks to be counted, in accordance with this part of ISO 5350. The maximum grammage for most pulp sheets is in the range 800 g/m² to 1 000 g/m².

If the sheets of the mill sheeted pulp have high grammage or are very opaque for other reasons, ISO 5350-1 should be applied.

NOTE For thick sheets, with highly textured surfaces and/or with density variations, wetting the sheet will cause optical variations, called lens distortions, that will distort the perceived size of a dirt speck, thus reducing the precision of the size estimation. Alternatively, use ISO 5350-1 to disintegrate the sheet and to prepare laboratory sheets for the size estimation.

This part of ISO 5350 is not intended for recycled pulp.

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 638, *Pulps — Determination of dry matter content*

ISO 7213, *Pulps — Sampling for testing*

3 Terms and definitions

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

3.1

sheet

a sheet of pulp taken from a bale, or a part of a roll of pulp

3.2

test piece

an area taken for inspection

3.3
contrary in pulp
any unwanted particle, of specified minimum size and having a contrasting colour or opacity with respect to the surrounding area of the sheet, according to the comparison chart given in Annex A

3.3.1
dirt
any non-fibrous contrary

3.3.2
shive
sliver of wood, or fibre bundle

4 Principle

The test pieces to be examined 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 test piece according to the comparison chart given in Annex A, is estimated. The estimated areas of the contraries are added, and the total area of dirt and shives is reported as square millimetres per kilogram of oven-dry pulp (mm^2/kg).

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

5 Apparatus

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5.1 Viewing table, with an illumination device suitable for inspecting the test pieces in transmitted artificial daylight. The luminance, as measured at the surface of the viewing table, shall be 2 500 cd/m^2 to 3 000 cd/m^2 . 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 transparent 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 provided in normative Annex A.

Do not use a photocopy of the chart in any inspection, because reproduction may change the size and contrast of the spots.

6 Sampling and preparation of test pieces

6.1 Sampling

If the test is being made to evaluate a pulp lot, the sample shall be selected in accordance with ISO 7213. If the test is made on another type of sample, report the source of the sample and, if possible, the sampling procedure used. From the sample received, select test pieces so that they are representative of the whole sample.

6.2 Selection of test pieces for inspection

In order to ensure that the results are representative of the sample received, take a number of test pieces evenly distributed over the different parts of the sheet, so that the total mass to be inspected is at least 300 g, the total area being not less than 0,5 m^2 .

NOTE The specks may be unevenly distributed in the sheet and the result can vary considerably depending upon how the test pieces to be inspected are selected. It is important that the test pieces for inspection are distributed over the whole sheet if the sheet is larger than 300 g.

It is very time consuming to examine a pulp with a very high dirt count. If a preliminary test shows that the number of contraries exceeds 300 per kilogram of oven-dry pulp, the amount to be inspected can be reduced to 100 g of oven-dry pulp. This shall be reported with the results.

7 Procedure

7.1 Determination of dry matter content

Determine the dry matter content of the test pieces in accordance with ISO 638.

7.2 Wetting of the test pieces

Wet the test pieces evenly in order to make them transparent. Wetting of the test pieces may be omitted if the test pieces are transparent enough to ensure that all contraries are visible, but omission of the wetting procedure shall be reported together with the results.

Even with wetting of the test piece, the opacity of the pulp sheet may not allow for all of the contraries to be counted. To ensure that all contraries are visible, mark a small contrary at the surface of the sheet and check the visibility of this contrary when viewing the sheet from the other side.

7.3 Examination

Examine the test pieces (6.2) visually using the viewing table (5.1). Use the comparison chart in Annex A as an aid to estimate the area of each speck. Only contraries having an area of $\geq 0,04 \text{ mm}^2$ shall be noted. Size class 5 can be omitted, if agreed upon.

Classify the contraries according to their area (see Table 1). Distinguish between dirt and shives, if required. Ensure that no contraries are counted twice.

Do not count any atypical, non-representative piece of dirt, such as a crushed insect or a blotch of dirt, but report it separately together with the result.

7.4 Classification of contraries

It is usual to report only the total area of contraries, although when required the contrary area in each class can be reported. In this case, the classification given in Table 1 shall be used. Size class 5 can be omitted, if agreed upon, but this shall be stated in the test report.

Table 1 — Recommended classification of contraries according to area

Size class	Area mm^2	Logarithmic mean area $[(A_{\max} - A_{\min}) / \ln(A_{\max} / A_{\min})]$ mm^2
1	above 5	—
2	1,00 to 4,99	2,482
3	0,40 to 0,99	0,651
4	0,15 to 0,39	0,251
5	0,04 to 0,14	0,080