INTERNATIONAL STANDARD

ISO 22414

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Paper — Cut-size office paper — Measurement of edge quality

Papier — Format de coupe du papier de bureau — Mesurage de la qualité des bords

Reference number
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Contents

Page

Foreword

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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 22414 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

Paper — Cut-size office paper — Measurement of edge quality

1 Scope

This International Standard specifies a test method for assessing the quality of the cut edge of cut-size office paper. It is applicable to papers of the type described in ISO 216, as well as other cut-size office papers used for printing and copying.

The measurement may be made on papers as received, with or without conditioning.

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 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 216, *Writing paper and certain classes of printed matter — Trimmed sizes — A and B series*

3 Terms and definitions

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

3.1
edge quality
a measure of the degree of raggedness of cut or slit paper edges

NOTE The degree of raggedness is expressed as a numeric value.

3.2
cut-size office papers
papers in the range 60 g/m^2 to 150 g/m^2 which are used for writing and/or in various printing and copying devices

[ISO 14968:1999]

3.3
ream
a pack of 500 identical sheets of paper

NOTE In many countries it is common practice to use the term “ream” for other quantities, for example 480 sheets, thus affecting the quire. For quantities other than 500 sheets, a different term, such as “pack”, should be used.

[ISO 4046-3:2002].

4 Principle

Estimate the edge quality by comparison of the sheet edge with a series of standard gaps on a quality-measurement template (see Annex A). Each gap is defined by the distance between two parallel lines. Examination of the sheet edge is done optically at a magnification of 42 times. Over 200 mm of the magnified edge, an estimate is made of the distance between the highest peak and the lowest valley exhibited by the edge under examination.

5 Apparatus

5.1 Viewing device

Any device capable of casting an image of the sheet edge, at a magnification of 42 times, upon a measuring table for comparison with a series of standard gaps (see Annex A).

NOTE For example, microfilm readers have been found to be suitable for this purpose.

5.2 Quality-measurement template

The quality-measurement template displays six sets of parallel lines, each 200 mm long. Draw or print these lines on a transparency or on paper using a pen with an extra fine point. The lines shall have straight outlines and shall not be fuzzy. Particular care should be taken that templates reproduced using xerography or any other technique shall be identical in scale to the original. The distance between the parallel lines for the six sets shall be as follows.

First set:	Gap of 1 mm between lines.	This set is defined as value 1.
Second set:	Gap of 2 mm between lines.	This set is defined as value 2.
Third set:	Gap of 3 mm between lines.	This set is defined as value 3.
Fourth set:	Gap of 4 mm between lines.	This set is defined as value 4.
Fifth set:	Gap of 5 mm between lines.	This set is defined as value 5.
Sixth set:	Gap of 6 mm between lines.	This set is defined as value 6.

NOTE Drawing six sets is sufficient, as in general less than 5 % of the cut edges are worse than value 5.

6 Sampling and preparation of test pieces

6.1 If tests are being made to evaluate a lot, the samples shall be selected in accordance with ISO 186, but with the following method of selection:

A lot is either to be defined as

— the number of reams for a certain order, or

— the number of reams produced within a certain time frame.

Lot size	1	$\leqslant$ 500 reams:	select 1 ream to inspect.
Lot size	501	$\leqslant$ 1 000 reams:	select 2 reams to inspect.
Lot size	1 001	$\leqslant$ 10 000 reams:	select 4 reams to inspect.
Lot size	10 001	$\leqslant$ 20 000 reams:	select 8 reams to inspect.
Lot size	20 001	$\leqslant$ 30 000 reams:	select 12 reams to inspect.
Lot size		$>$ 30 000 reams:	select an additional 4 reams for each lot increase of 10 000 reams.

6.2 For the purpose of this International Standard, a test piece shall be a pack of six consecutive sheets taken from the same ream of paper.

6.3 Do not touch or damage the edges of the sheet. Select only undamaged sheets that are free from wrinkles. Sheets shall be free from any edge damage.

6.4 Identify the machine direction of the paper.

6.5 As agreed between the interested parties, make the determination either with or without conditioning. If the sample is to be conditioned, conditioning shall be done in accordance with ISO 187.

7 Procedure

7.1 Start by taking an individual sheet from the test piece, using great care not to damage the edges.

7.2 Place the individual sheet in the viewing device so that the projection of the cut edge to be measured is horizontal across the centre of the viewing screen and can be seen clearly.

7.3 Match the cut edge to the smallest possible gap, so that the highest peak and the lowest valley fit between the two parallel lines along the entire 200 mm length. Carry out a measurement at each of the two corners of the edge being examined, and also a measurement near the midpoint of the edge (see Figure B.1). Specify the individual three results to their nearest integral gap, and record the worst result (see Figure B.2). This has to be done for each of the four sides of the sheet.

7.4 If the edge has individual fibres protruding, ignore their presence. If the fibres are numerous, report their presence by placing an H next to the average cut quality on the report.

Repeat the procedure specified in 7.2 and 7.3 with the remaining five consecutive sheets.

7.5 Repeat the procedure for each of the reams selected in accordance with Clause 6.

8 Expression of results

8.1 The results shall be recorded as the frequency of edge quality for each ream tested. For each ream, record the number of values 1, 2, 3, 4, 5, 6, $>$ 6.

8.2 Record the long-edge and short-edge values separately, since the edge quality will differ due to differences in cutting technology used for the two different directions.

8.3 Calculate the average and the standard deviation for each test piece and for the combined population of all the test pieces tested from a single lot. Do this separately for the long edge and the short edge.

9 Test report

The test report shall include the following inforrmation:

a) reference to this International Standard;

b) specific identification of the sample tested;

c) date and place of testing;

d) average and standard deviation of each test piece, tested from a single lot as stated in 8.3;

e) information about conditioning as stated in 6.5;

f) size of sheets;

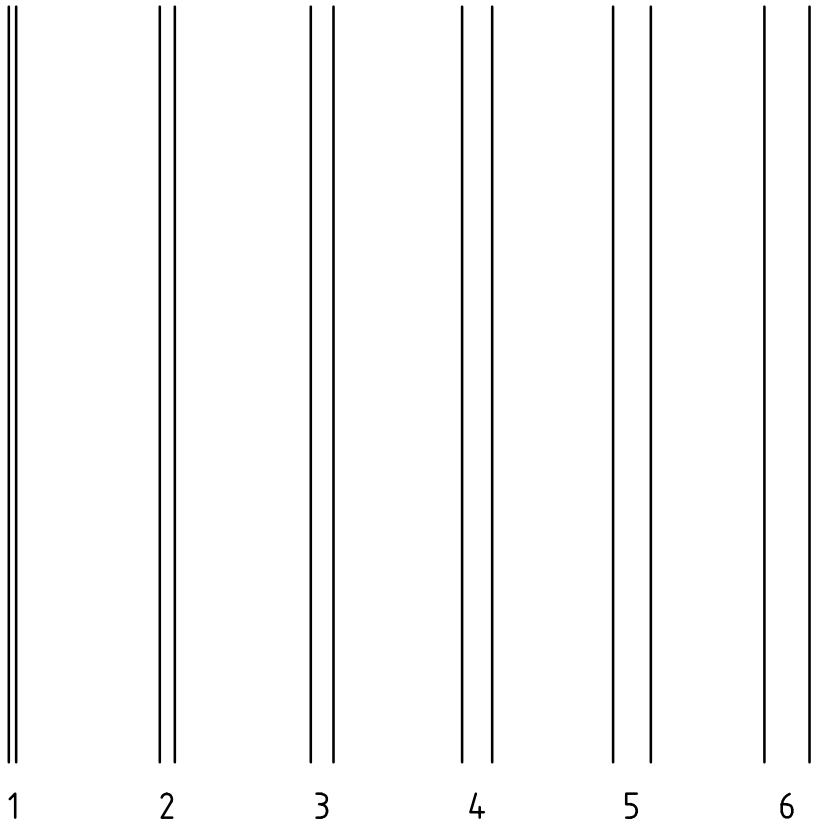
g) number of test pieces;

h) the average edge-quality value and the standard deviation for the short edge and the long edge separately;

i) any departure from this International Standard or any other circumstances that may have affected the results.

Annex A
(normative)

Standard gaps for comparison of the sheet edge



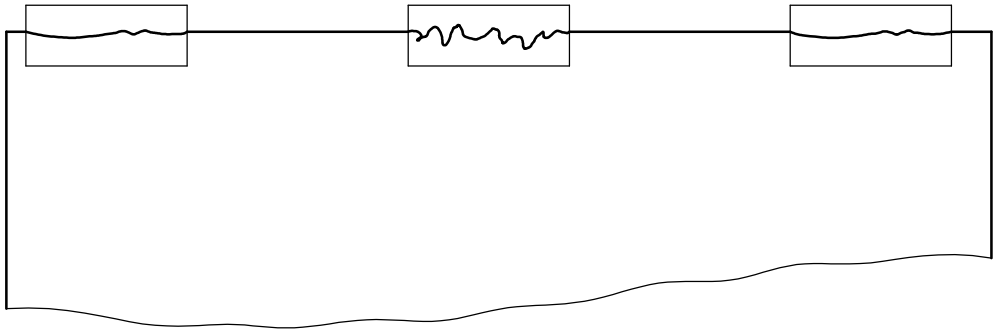
Key

1 gap 1 mm = value 1
2 gap 2 mm = value 2
3 gap 3 mm = value 3
4 gap 4 mm = value 4
5 gap 5 mm = value 5
6 gap 6 mm = value 6

Figure A.1 — Sample of the parallel sets of bars for a magnification of 42 times

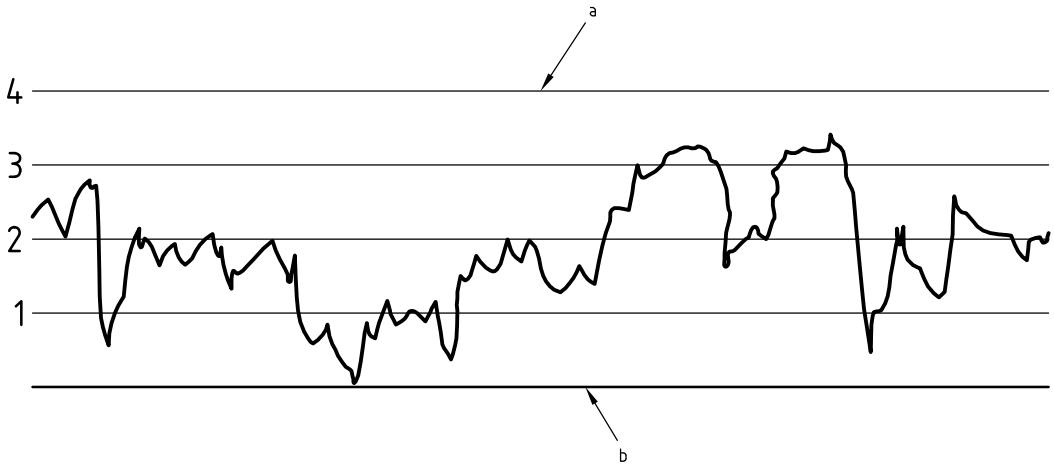
Annex B
(informative)

Graphic explanation and example according to subclause 7.3



Carry out three tests per edge.
One of the three results is the worst result which shall be recorded.

Figure B.1 — Position of the three tests with one worst result



Key

1 1 mm gap to bottom line
2 2 mm gap to bottom line
3 3 mm gap to bottom line
4 4 mm gap to bottom line

a Area of highest peak (value 4).

b The bottom line is parallel to the lowest valley (value 0).

The smallest possible gap, so that the highest peak and the lowest valley fit between the two parallel lines, is value 4.
The highest peak has its nearest integral gap at value 3.
The result of this cut edge is value 3, because the highest peak is closer to value 3 than to value 4.

Figure B.2 — Nearest integral gap

Bibliography

[1] ISO 4046-3:2002, *Paper, board, pulps and related terms — Vocabulary — Part 3: Paper-making terminology*

[2] ISO 14968:1999, *Paper and board — Cut-size office paper — Measurement of curl in a pack of sheets*

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