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Paper and board — Cut-size office paper — Measurement of curl in a pack of sheets

Papier et carton — Papier en format à usage de bureau — Mesurage du tuilage dans un paquet de feuilles

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 14968:1999), of which it constitutes a minor revision.

The main changes are as follows:

— the normative references in Clause 2 have been updated;

— editorial corrections have been applied.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Curl in cut-size office papers plays an important part in the performance of these papers in copying processes. Frequently, cut-size papers are used on copier and other printing devices, operating at high speeds. Curl which exists in the ream before the paper enters the imaging process, and curl developed during the imaging process, can affect office paper performance, especially if two-sided printing or collating is involved. Common problems experienced include jamming and misregistration.

The experience used in developing this test method was limited to uncoated papers in the commonly used cut sizes. The technique is basic and can be used with coated papers as well as paperboard to identify the type and magnitude of curl.

The test method identifies the type and degree of curl in a pack of sheets but does not address variations that might be present in individual sheets. The method of ISO 11556 can be used to measure curl in individual sheets.

It should be recognized that the curl occurring after processing in a copier or a printing device may bear no relation to the curl of the paper as received.

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Paper and board — Cut-size office paper — Measurement of curl in a pack of sheets

1 Scope

This document specifies a method for the measurement of curl in cut-size office papers. The test method is typically used in evaluating papers of the type described in ISO 216.

This method is limited to papers with a maximum dimension of 300 mm in both directions.

The measurement can be made on papers as received, after conditioning, or after processing in a copier or printing device.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 186:2002, *Paper and board — Sampling to determine average quality*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
curl
deviation from a flat surface which has three major components: magnitude, direction of curl axis and the side towards which the paper curls

3.1.1
curl magnitude
quantitative measure of the deviation of a paper test piece from a flat surface

Note 1 to entry: It is expressed as the reciprocal of the radius of curvature, R, of the curled test piece with units of reciprocal metres (m^{-1}).

Note 2 to entry: The radius of curvature for the curled test piece is the distance from the arc to the centre of a circle, of which the arc forms a part. The reciprocal radius (R^{-1}) has a value of zero for a flat sheet.

Note 3 to entry: Curl characteristics of paper and board are time-dependent and the magnitude of any curl may be transient.

3.1.2
curl axis direction
direction of the curl axis of paper and board, characterized as follows:

— curl axis which is perpendicular to the paper's machine direction;

— curl axis which is parallel to the paper's machine direction;

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— curl axis which is neither parallel nor perpendicular to the paper's machine direction.

Note 1 to entry: See Figures A.1 to A.3, respectively.

3.1.3
concave side
side towards which the paper or board curls

Note 1 to entry: See also Annex A.

3.2
double curl
form of curl which tends to alternate between the two sides, when the sheet is manipulated lightly

Note 1 to entry: This tendency is a phenomenon which may be described as two curl patterns that are finely balanced within the same sheet of paper.

3.3
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

3.4
reference side
for a non-imaged paper that side indicated by arrows on the end labels of a sealed ream, that side facing the top of a box of unwrapped sheets or, if arrows, or other instructions, are not present, that side facing the wrapper seam

4 Principle

A pack of approximately 10 to 15 sheets is taken from the sample to be tested and the magnitude of the curl is measured, noting the curl axis direction and the side towards which the paper curls.

5 Apparatus

5.1 Curl gauge

Consisting of a straight line 210 mm long and companion arcs at least 210 mm long of radii such that their curl magnitude varies between 1,00 m^{-1} and 10,00 m^{-1}. The construction of such a gauge is shown in Annex B.

Copies of the curl gauge made on a toner-imaging device should not be used because such a device frequently has a built-in enlargement which would change the dimensions of the arcs.

It can be convenient to use a set of templates with their edges corresponding to the curl of magnitudes given in Annex B. Each template should be labelled with its curl magnitude.

6 Test atmosphere

The purpose of this method is usually to test the inherent curl of the paper at the moisture content that it has immediately following its removal from a ream, or after processing in a copier or other printing device.

In this case, the paper shall not be conditioned in a standard atmosphere. The actual testing may be carried out either in the standard atmosphere described in ISO 187, or under the measured ambient conditions of the area surrounding the imaging device.

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