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Paper — Determination of tearing resistance — Elmendorf method

Papier — Détermination de la résistance au déchirement — Méthode Elmendorf

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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 1974 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 fourth edition cancels and replaces the third edition (ISO 1974:1990), which has been technically revised. The specification for the tester has been moved from Annex A to Clause 5 and is given in more general terms so that this International Standard is applicable to a wider range of designs. In addition, new precision data have been inserted in Annex C.

Paper — Determination of tearing resistance — Elmendorf method

1 Scope

This International Standard specifies a method for determining the (out-of-plane) tearing resistance of paper. It can also be used for boards having a low grammage if the tearing resistance is within the range of the instrument.

This International Standard does not apply to corrugated fibreboard, but it may be applied to the components of such boards. It is not suitable for determining the cross-direction tearing resistance of highly directional paper (or board).

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 536, *Paper and board — Determination of grammage*

3 Terms and definitions

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

3.1
tearing resistance
mean force per sheet required to continue the tearing started by an initial cut in the test piece

NOTE 1 If the initial cut is in the machine direction, the result is given as the machine-direction tearing resistance; similarly, if the initial cut is in the cross-direction, the result is given as the cross-direction tearing resistance.

NOTE 2 The tearing resistance is expressed in millinewtons (mN).

3.2
tear index
tearing resistance of the paper (or board) divided by its grammage

NOTE The tear index is expressed in millinewton square metres per gram ($mN \cdot m^2/g$).

3.3
test piece
pack of four rectangular sheets of the same size

NOTE The dimensions depend on the design of the apparatus clamp used (see Clause 8).

4 Principle

An initial cut is made in a test piece (of four superimposed sheets), which is then torn out-of-plane through a given distance along one single tear line using a pendulum. The work done in tearing the test piece is measured as the loss in energy of the pendulum.

The mean tearing force of a single sheet is calculated by dividing the work done by the distance torn and the number of sheets in a test piece.