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**Paper and board — Determination of  
bending stiffness — General principles  
for two-point, three-point and four-  
point methods**

*Papier et carton — Détermination de la rigidité à la flexion —  
Principes généraux pour les méthodes à deux points, à trois points et à  
quatre points*



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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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://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 third edition cancels and replaces the second edition (ISO 5628:2012), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

- in [6.4.2](#), a Note has been added to clarify the measurement of  $F$ .

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](http://www.iso.org/members.html).

## Introduction

Bending stiffness is regarded as an important property of paper and board, and a large number of test methods have been used for its determination. This is a result, in part at least, of the wide range in the bending stiffness of paper and board. For paper and board in the grammage range 50 g/m<sup>2</sup> to 500 g/m<sup>2</sup>, bending stiffness might vary by a factor of over 1 000. This wide variation is reflected in the design of instruments intended for the measurement of this property.

A second factor to be taken into account is that, in general terms, bending stiffness (as defined here) can only be determined with accuracy within certain limits with regard to the degree of deformation imposed upon the test piece. These limits depend on the dimensions of the test piece and on the test method used.

This document is intended to enable the bending stiffness (as defined here) to be measured and described in a consistent way, despite the variations in material type and instrument design. It will be found that many commercially available instruments can be regarded as giving results in accordance with this document for only part of the range of bending stiffness, or for only some of the materials for which they were originally designed. It is intended, therefore, that this document will be used as the basis for preparing detailed methods for determining bending stiffness, using particular instruments.



# Paper and board — Determination of bending stiffness — General principles for two-point, three-point and four-point methods

## 1 Scope

This document specifies three test methods for determining the bending stiffness of paper and paperboard. The test methods differ in the type of loading mode, thus giving rise to the two-point, three-point and four-point bending test methods.

For paper and paperboard in a low thickness range, the two-point bending method and the three-point bending method are suitable.

For corrugated fibreboard and board with a higher thickness, the four-point bending method is recommended.

The measurement conditions are defined in such a way that the test piece is not subjected to any significant permanent deformation during the test, nor is the range of validity of the formulae for calculating the bending stiffness exceeded.

In these bending tests, the test pieces of paper and board are regarded as “beams” as defined by the science of the strength of materials, see Reference [2].

## 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, *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 534, *Paper and board — Determination of thickness, density and specific volume*

ISO 3034, *Corrugated fibreboard — Determination of single sheet thickness*

## 3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>