
**Paper and board — Determination of the
static and kinetic coefficients of friction —
Horizontal plane method**

*Papier et carton — Détermination des coefficients de frottement statique et
cinétique — Méthode du plan horizontal*

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Foreword

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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.

International Standard ISO 15359 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

Annexes A and B of this International Standard are for information only.

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Introduction

This International Standard describes a procedure for the determination of the static and kinetic coefficients of friction of paper or board by the horizontal plane method.

The condition of the surfaces of a paper depends on their history. Their frictional properties are largely determined by the static and kinetic coefficients of friction which are determined, in this International Standard, by sliding one sheet of paper over another sheet of the same paper, or another surface in the horizontal plane, with a downwards vertical force applied to the upper material. The friction property relates to the horizontal force required to initiate and maintain movement between the two surfaces.

The coefficients of friction are properties of two surfaces. The values obtained for the coefficients are influenced by test conditions. The condition of the two surfaces under the conditions specified in this International Standard may or may not relate to the condition of the surfaces in a specific end-use situation. Nevertheless, the test results are useful in determining the combined properties of the surfaces tested.

The coefficients of friction of a machine-made paper can be different when measured in the machine direction, MD, or in the cross direction, CD. Often there is a difference between the two sides of the paper.

For certain papers, e.g. copy paper, only the static coefficient of friction at the first slide, i.e. the coefficient obtained without any previous sliding of the surfaces across each other, between the lower surface of one sheet of paper and the upper surface of another paper of the same kind may be of interest.

For certain other paper grades, e.g. shipping sack paper, linerboard and solid fibreboard, the coefficients of friction after a given amount of wear between the surfaces may be of interest. In this International Standard, to determine the coefficients of friction of worn surfaces, one test piece is caused to slide with respect to the other test piece three times. The force required to initiate and maintain sliding on the third slide is measured.

The intended use of the paper grade determines the sides of the papers which are to be in contact, the direction of the paper test pieces with respect to the direction of sliding and the number and type of coefficients of friction to be evaluated.

Annex A provides a list of recommended symbols to indicate the directions and positions of the surfaces tested.

Annex B provides a summary of test conditions for some common standard methods for paper products and plastics.

A bibliography follows the annexes.

Paper and board — Determination of the static and kinetic coefficients of friction — Horizontal plane method

1 Scope

This International Standard specifies

- a friction-testing method based on the horizontal plane principle, and
- the procedure for the determination of the static coefficient of friction before, and static and kinetic coefficients of friction after, a specified amount of wear between the surfaces.

It is applicable to paper and board.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 186:1994, *Paper and board — Sampling to determine average quality*.

ISO 187:1990, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*.

ISO 4046:1978, *Paper, board, pulp and related terms — Vocabulary*.

3 Terms and definitions

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

3.1 friction

resisting force that arises when a surface of one material tends to slide or slides over another surface of the same or some other material

3.2 static friction

force that resists initiation of movement of one surface sliding over another surface

NOTE The force required to initiate movement is equal to that which resists initiation of movement.

3.3 static coefficient of friction, μ_S

ratio of the static friction to the force applied perpendicularly to the two surfaces in a friction test