
**Corrugated fibreboard —
Determination of edgewise crush
resistance (unwaxed edge method)**

*Carton ondulé — Détermination de la résistance à la compression sur
chant (méthode sans enduction de cire)*



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Foreword

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The committee responsible for this document is ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

This fifth edition cancels and replaces the fourth edition (ISO 3037:2007), which has been technically revised. Specifications for the compression testing machine have been replaced by reference to ISO 13820. Details of acceptable cutting devices have been moved to an informative annex and have been replaced by specifications of the quality of cut. In addition, precision data have been inserted in [Annex B](#).

Introduction

A variety of methods for the determination of edgewise crush resistance are in use in different parts of the world. These can be classified into three groups as follows:

- a) Those in which a carefully cut rectangular test piece is tested without any special treatment or modification (e.g. ISO 3037).
- b) Those in which the edges of the test piece to which the force is applied are waxed, to prevent the test result being influenced by “edge effects” (e.g. ISO 13821, *Corrugated fibreboard — Determination of edgewise crush resistance — Waxed edge method*).
- c) Those in which the test piece edges are not waxed but the shape of the test piece is such that the length is substantially reduced at a point midway between the loaded edges, in order to induce the failure to occur away from those edges (e.g. JIS Z 0403-2).

The dimensions of the test piece vary from one group to the other and, in group c), the methods vary in the shape and method of reducing the length, and in whether or not the test piece is held in a clamp during crushing.

The methods may not give the same numerical results, but it can be shown that most of them can be used to predict the top-to-bottom compression strength which will be achieved when the board is properly converted into a transport package.

This International Standard describes a method from group a). It is intended as a method for quality measurement and quality specification purposes and is selected because it correlates with the top-to-bottom compression strength of the final transport package and because it is the simplest and most operationally convenient method, an important factor when large numbers of tests need to be conducted. However, it does not measure the actual intrinsic compressive strength of the corrugated fibreboard, giving lower results than most of the methods in groups b) and c). This systematic difference is due to edge effects.

Other methods may be used for other purposes, particularly when the object of the test is to study fundamental structural characteristics of the package.

There are methods available for calculating the edgewise crush resistance from the compression strength of the component papers.

Corrugated fibreboard — Determination of edgewise crush resistance (unwaxed edge method)

1 Scope

This International Standard specifies an unwaxed edge method for the determination of the edgewise crush resistance of corrugated fibreboard. It is applicable to all corrugated fibreboard grades.

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 13820, *Paper, board and corrugated fibreboard — Description and calibration of compression-testing equipment*

3 Terms and definitions

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

3.1

edgewise crush resistance

maximum force per unit length that a test piece of corrugated fibreboard can support until the onset of failure when a compressive force is applied with the flute structure perpendicular to the loading surfaces

4 Principle

A rectangular test piece of corrugated fibreboard, placed between the platens of a compression tester with the flutes perpendicular to the surfaces of the platens, is subjected to an increasing compressive force until failure occurs. The maximum force sustained by the test piece is measured.

5 Apparatus

5.1 Fixed-platen compression testing machine as described in ISO 13820. It is preferable to avoid the use of emery paper on the platens.

While it is safer to avoid the use of emery paper on the platens, because it is a requirement of other test methods, the platens may be faced with very fine emery paper of a grade not coarser than 00. Where this is done, due regard should be paid to maintaining the flatness and parallelism requirements specified for the faces.

NOTE A flexible beam compression tester per ISO 13820 is not recommended for this test method as there are significant questions regarding its ability to be maintained with sufficient parallelism to provide accurate test values for these specimens.