



SLOVENSKI STANDARD
oSIST prEN ISO 3037:2022

01-marec-2022

Valoviti karton - Določanje robne odpornosti (metoda ECT) (ISO/DIS 3037:2022)

Corrugated fibreboard - Determination of edgewise crush resistance (non-waxed edge method) (ISO/DIS 3037:2022)

Wellpappe – Bestimmung des Kantenstauchwiderstandes (Verfahren für ungewachste Kanten) (ISO/DIS 3037:2022)

Carton ondulé - Détermination de la résistance à la compression sur chant (méthode sans enduction de cire) (ISO/DIS 3037:2022)

Ta slovenski standard je istoveten z: prEN ISO 3037

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ICS:

85.060 Papir, karton in lepenka Paper and board

oSIST prEN ISO 3037:2022

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 3037

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Corrugated fibreboard — Determination of edgewise crush resistance (non-waxed edge method)

ICS: 85.080.30

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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).

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).

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.

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 sixth edition cancels and replaces the fifth edition (ISO 3037:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the title has changed from "Corrugated fibreboard - Determination of edgewise crush resistance (unwaxed edge method)" to "Corrugated fibreboard - Determination of edgewise crush resistance (non-waxed edge method)";
- specifications for the compression testing machine have been replaced by reference to ISO 13820;
- introduction has been updated further highlighting the impact of edge effects and the incomparability of different test methods;
- scope has been complemented by additional information about the corrugated fibreboard grades;
- terms "buckling" (3.2) and "tipping" (3.3) were included into [Clause 3](#);
- [Clause 6](#) "Sampling" has been revised;
- [Clause 9](#) "Procedure" has been updated and a constant feed rate has been added;
- [Clause 11](#) "Test report" has been updated;
- [Annex A](#) has been revised;
- Bibliography has been updated;
- editorial changes and adoption to ISO regulations.

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

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 four groups as follows:

- a) Those in which a carefully cut rectangular test piece is tested without any special treatment or modification (e.g. this document).
- 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).
- 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).
- d) Those in which carefully cut rectangular pieces are tested with edges clamped to prevent the result from being influenced by edges effects (e.g. TAPPI T 839).

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 and experience has shown that results for the four groups of test methods will not correlate, but it can be shown that most of them can be used (at varying levels of accuracy) to predict the top-to-bottom compression strength which will be achieved when the board is properly converted into a transport package, provided that the formula to predict BCT values from ECT results is based on data from the ECT method being used.

This document 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), c) and d). This systematic difference is due to edge effects.

Other methods can 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 (non-waxed edge method)

1 Scope

This document specifies a non-waxed edge method for the determination of the edgewise crush resistance of corrugated fibreboard.

It is applicable to all corrugated fibreboard grades from K to D, including manufacturers specification grades of the similar dimensions. For E grades it is applicable if no buckling and/or tipping occurs during measurement. Under the defined test piece dimensions, grades finer than E are excluded, since they are not measurable due to buckling and tipping.

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

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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

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

3.2

buckling

failure mode distinct from pure compression, where the mid-part of the sample moves substantially out of the vertical plane creating a “c” or similar shape

Note 1 to entry: This can occur when the bending resistance of the sample is lower than the compression resistance of the sample for the given geometry of the test piece, or when sample edge imperfections add an angular or rotational component to the force from the loading platens.

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3.3

tipping

failure mode distinct from pure compression, where the load drops off because the sample leans or falls over during the test

Note 1 to entry: This occurs primarily due to sample edge imperfections leading to a sideways component to the applied load.

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.

5.2 Cutting device, such as a high-speed table saw or Billerud-type cutter (see [Annex A](#)), capable of cutting test pieces to the quality of cut described in [8.3](#) and [8.4](#).

5.3 Guide blocks, two rectangular, smooth-finished, blocks of dimensions approximately 20 mm × 20 mm × 100 mm, to support the test piece and keep it perpendicular to the platen surfaces. It is advisable to fit each guide block with a probe, to enable each block to be moved safely during the test.

6 Sampling

If the average quality of a lot of corrugated fibreboard is to be determined, sampling shall be carried out in accordance with ISO 186.

If another type of sample is to be tested, make sure that the test pieces taken are representative of the sample received.

Sample away from score lines, joints, and closures and ensure that the test pieces are free of visible folds, creases, cracks, washboarding, converting machine marks or other defects. If not possible, it shall be mentioned in the test report.

NOTE 1 Especially washboarding of corrugated board can have a severe impact on the test values.

If printed areas are tested, it shall be mentioned in the test report.

NOTE 2 When testing of finished packaging is undertaken, testing of printed areas can be encouraged or required in some situations so that test values are representative of the material examined. In this case, random sampling of the packaging material will lead to a fraction of samples from the printed area in rough proportion to the fraction of the box which has been printed. Because printed areas can be damaged in the printing process, including printed areas can increase the measured variation in the test.

7 Conditioning

The sample shall be conditioned in accordance with ISO 187.