AS/NZS 1301.444s:2004

Australian/New Zealand Standard™

Methods of test for pulp and paper

Part 444s: Corrugated fibreboard—Determination of edgewise crush resistance (Unwaxed edge method) (ISO 3037:1994, MOD)

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper. It was approved on behalf of the Council of Standards Australia on 7 June 2004 and on behalf of the Council of Standards New Zealand on 9 July 2004.
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The following are represented on Committee PK-019:

Australian Plantation Products and Paper Industry Council (A3P)
Appita
CSIRO Forestry and Forest Products
National Association of Forest Industries
New Zealand Forest Research Institute

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee PK-019, Methods of Test for Pulp and Paper to supersede AS 1301.444s—1992 and NZS 1301.444s—1992, *Methods of test for pulp and paper*, Method 444s: *Edgewise compression resistance of corrugated fibreboard.*

The objective of this Standard is to provide a method for those concerned with determining the edgewise crush resistance of corrugated fibreboard.

This Standard is an adoption with national modifications and has been reproduced from ISO 3037:1994, *Corrugated fibreboard—Determination of edgewise crush resistance (Unwaxed edge method).* The modification, as set out in item (d) below was necessary because of a tighter tolerance placed on the extent to which the platens of the crush tester specified in the modification can deviate from parallel and also because the modification contains instructions for the care, maintenance and calibration of the crush test equipment. The change is indicated in the text by a marginal bar.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(b) In the source text, 'this International Standard' should read 'this Australian/New Zealand Standard'.

(c) A full point should be substituted for a comma when referring to a decimal marker.

(d) Delete Clause 4.1 and replace with '**4.1 Crush testing equipment** The crush testing equipment shall be as described in AS/NZS 1301.449s, *Methods of test for pulp and paper*, Method 449s: *Description of crush testing equipment*.'

NOTE: The text affected in the source document is indicated by a marginal bar.

The references to International Standards should be replaced by references to the following Australian/New Zealand Standards.

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS	
186	Paper and board—Sampling to determine average quality	1301 1301.417s	Methods of test for pulp and paper, Method 417s: Sampling paper, board and pulp for testing
187	Paper, board and pulps—Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples	1301.P414m 1301.415s	Method P414m: Conditioning of paper for testing Method 415s: Standard atmosphere for testing paper and board and procedure for monitoring the atmosphere

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.

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".

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.

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 of 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.

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper

Method 444s:
Corrugated fibreboard—Determination of edgewise crush resistance (Unwaxed edge method) (ISO 3037:1994, MOD)

1 Scope

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

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO 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.*

3 Principle

Subjection of a rectangular test piece of the corrugated fibreboard, placed between the platens of a crush tester with the flutes perpendicular to the surfaces of the platens, to a compressive force until failure occurs.

Measurement of the maximum force sustained by the test piece.

4 Apparatus

4.1 Motor-driven, platen-type, crush tester

The platens shall be large enough to take a test piece of the required size (see 7.2) and the guide blocks (4.3) without any part of the test piece projecting beyond the edges of the platens.

They shall be flat and also meet the following requirements:

— deviation from parallel shall not be greater than 1:1 000 of the dimensions;

— lateral play shall not exceed 0,05 mm.

NOTE 1 Because it is a requirement of other crush methods, the platens may be faced with very fine emery paper, but where this is done, due regard should be paid to maintaining the flatness and parallelism requirements prescribed for the faces. However, it is preferable to use clean unfaced platens when testing in accordance with this International Standard, and therefore it is advisable to provide two sets of platens, one unfaced and one faced with fine emery paper, and to use whichever set is appropriate to the test to be carried out.

4.1.1 If the tester operates with one fixed platen, the other having a direct positive drive, the rate at which platens approach each other shall be 12,5 mm/min $\pm$ 2,5 mm/min. The tester shall be provided with a means of measuring the true peak force to within 1 N.

4.1.2 If the tester operates on the principle of beam deflection, the force applied by the platens shall be developed at a rate of 110 N/s $\pm$ 10 N/s when the platens contact with one another. The tester shall be provided with a means of measuring the true peak force to within 5 N or 1 %, whichever is the greater.