

Australian/New Zealand Standard™

**Methods of test for pulp and paper**

**Method 429: Flat crush resistance of  
corrugated board (ISO 3035:2011, MOD)**



## **AS/NZS 1301.429:2017**

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 5 April 2017 and by the New Zealand Standards Approval Board on 5 April 2017. This Standard was published on 1 June 2017.

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The following are represented on Committee PK-019:

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## Methods of test for pulp and paper

### Method 429: Flat crush resistance of corrugated board (ISO 3035:2011, MOD)

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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/NZS 1301.429s:2002, *Methods of test for pulp and paper*, Method 429s: *Flat crush resistance of corrugated board*.

This Standard is part of the AS/NZS 1301 series, *Methods of test for pulp and paper*.

The objective of this Standard is to provide a measure of the crushing resistance of the arch structure of corrugated board when subjected to loads applied perpendicular to the surface of the board and under conditions that minimize lateral motion of the facings. This test may be used on single-wall or single-face corrugated board, but is not suitable for and cannot be adapted to measuring the crushing resistance of double-wall corrugated board, which usually fails by lateral motion of the centre liner.

This Standard is an adoption with national modifications and has been reproduced from ISO 3035:2011, *Corrugated fibreboard—Determination of flat crush resistance*, and has been varied as indicated to take account of Australian/New Zealand conditions. The modifications are specified in Appendix ZZ.

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

- (a) In the source text ‘this International Standard’ should read ‘this Australian/New Zealand Standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific standards.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex or appendix to which they apply. A ‘normative’ annex or appendix is an integral part of a Standard, whereas an ‘informative’ annex or appendix is for information and guidance only.

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## INTRODUCTION

Fibreboard shipping containers can be subjected to compressive forces in the thickness direction as part of the manufacturing process, as well as during shipment or storage. These forces can compress the flute structure and reduce the structural integrity (stacking strength) of the corrugated material. Resistance to this type of crushing is an important measure of the performance characteristics of the container.

## AUSTRALIAN/NEW ZEALAND STANDARD

**Methods of test for pulp and paper**

Method 429:

Flat crush resistance of corrugated board (ISO 3035:2011, MOD)

**1 Scope**

This International Standard specifies a method for the determination of the flat crush resistance of corrugated fibreboard used in the manufacture of shipping containers.

This International Standard is applicable to single-faced and single-wall (double-faced) corrugated fibreboard.

This International Standard is not applicable to double-wall (double-double-faced) corrugated fibreboard and to microflute corrugated fibreboard, since the end-point of the test is not clearly defined or observable.

**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****flat crush**

maximum crushing force, applied perpendicular to the surface of the fluting structure, sustained before complete collapse of the structure

**3.2****collapse**

point where the sidewalls of the flutes are no longer able to support load because they have suffered compression damage

NOTE At this point, the fluting profile appears similar to that of a mushroom (see Figure 2).

**3.3****flat crush resistance**

flat crush divided by the area of the test piece under the condition of test

NOTE The flat crush resistance is expressed in kilopascals.

**4 Principle**

A test piece of corrugated fibreboard is subjected to an increasing force applied perpendicularly to the surface by a compression tester having two flat and parallel platens, until the fluting collapses.

The maximum force sustained by the test piece is divided by the test piece area.