INTERNATIONAL STANDARD

**ISO 7263**

Fourth edition
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# Corrugating medium — Determination of the flat crush resistance after laboratory fluting

*Papier cannelure pour carton ondulé — Détermination de la résistance à la compression à plat après cannelage en laboratoire*



Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 7263 was prepared by Technical Committee ISO/TC 6, *Paper board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.



This fourth edition cancels and replaces the third edition (ISO 7263:2008), of which it constitutes a minor revision. A misprint in 5.3.1 (8,55 mm) has been corrected and the calculation of the flat crush resistance index has been included in 10.2.

## Introduction

The flat crush resistance of laboratory-fluted corrugating medium is regarded as an important property because it is an indication of the potential flat crush resistance of corrugated fibreboard made from that medium. The corrugated medium is fluted by passing it between heated rollers. Two different test procedures are then widely used:

a) the fluted corrugating medium is compressed immediately after fluting (i.e. 5 s to 8 s after fluting);

b) the fluted corrugating medium is conditioned for 30 min to 35 min under standard laboratory test conditions before being compressed.

Procedure a) generally gives considerably higher results than those obtained with procedure b). The differences in results are claimed to be caused by

— the lower moisture content (and thus higher stiffness) of the unconditioned fluted corrugating medium, and/or

— the change in flute profile which occurs during the conditioning period.

Since considerable advantages are claimed for both procedures and both are widely used, this International Standard describes both procedures.



A method of determining the flat crush resistance of manufactured corrugated fibreboard is given in ISO 3035[1].

# Corrugating medium — Determination of the flat crush resistance after laboratory fluting

## 1 Scope

This International Standard specifies two methods for the determination of the flat crush resistance of a corrugating medium after laboratory fluting.

The procedures are applicable to any corrugating medium intended to be used, after fluting, in the manufacture of corrugated board.

## 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 536, *Paper and board — Determination of grammage*

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 resistance**
maximum force that a corrugated test piece will withstand before the flutes collapse under an increasing force applied perpendicular to its surface

NOTE Flat crush resistance is expressed in newtons.

**3.2**
**flat crush resistance index**
flat crush resistance divided by the grammage

NOTE The result is expressed in newton square metres per gram ($Nm^2/g$).

## 4 Principle

Fluting of the corrugating medium by passing it between heated rollers, and its formation into single-faced corrugated board using pressure-sensitive adhesive tape as the facing. Application of a crushing force, in the direction perpendicular to the plane of the flutes, and determination of the flat crush resistance.

## 5 Apparatus

**5.1** **Cutting device**, for cutting the test pieces to the dimensions required.

**5.2** **Fluter**, consisting of a pair of matched steel corrugating rolls.

The roll temperature shall be maintained at 175 °C ± 8 °C. The temperature is controlled by any suitable method. Check the temperature when the rolls are in motion.

One roll is motor-driven at 4,5 r/min ± 1,0 r/min and the rolls are held in mesh by a force of 100 N ± 10 N exerted between the rolls and distributed evenly across the teeth, under test conditions. In some instruments, the force between the rolls is applied by a spring acting in a slide. In such instruments, friction in this device can result in the force which acts upon the test piece being considerably less than the force required to displace the rolls initially. When verifying that an instrument conforms to the requirements given in this subclause, it is therefore necessary to measure the force required to just prevent the undriven roll from moving towards the driven roll, from a position about 200 µm away.

The essential characteristics of each roll are the following (see also Figure 1):

| | |
|---|---|
| Roll diameter | 228,5 mm ± 0,5 mm |
| Roll face width | 16 mm ± 1 mm |
| Number of teeth | 84 (see Note below) |
| Radius of teeth at peak | 1,5 mm ± 0,1 mm |
| Radius of teeth at base | 2,0 mm ± 0,1 mm |
| Depth of teeth | 4,75 mm ± 0,05 mm |
| Distance between teeth (peak-to-peak around the arc) | 8,55 mm ± 0,05 mm |



In order to optimize the matching of pairs of rolls, pairs of rolls should be selected in which the differences in dimensions between the two are substantially less than the tolerances shown. A difference of ±0,1 mm or better is recommended. Prior to first use, the rolls should be run at the operating temperature for about 6 h with a mild abrasive on the teeth. The two rolls should then be marked in some way so that, after removal for cleaning or maintenance, they can be reassembled with exactly the same teeth in mesh.

NOTE In some fluters, a full roll is not used.

Dimensions in millimetres

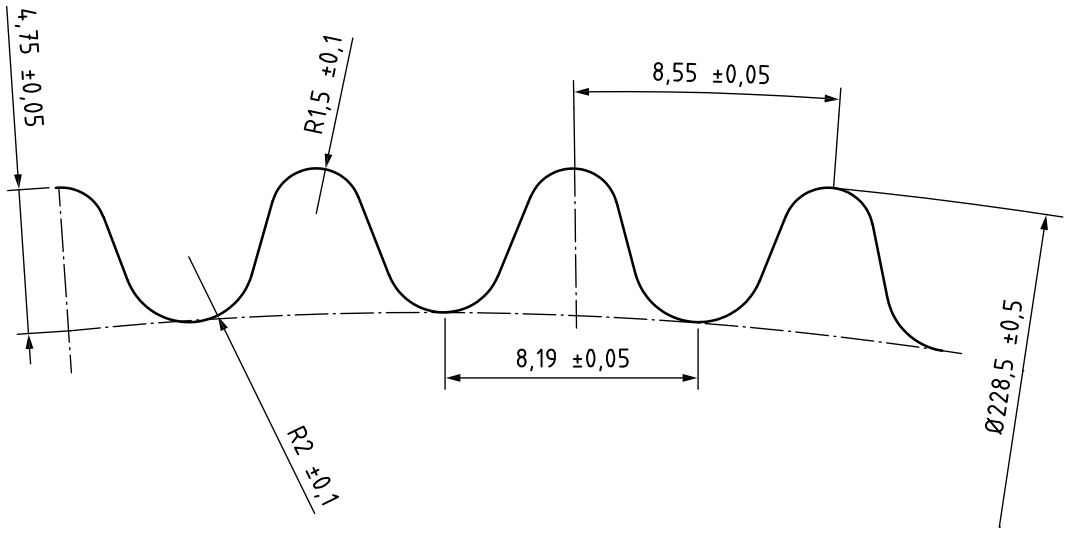



**Figure 1 — Profile of corrugating rolls**

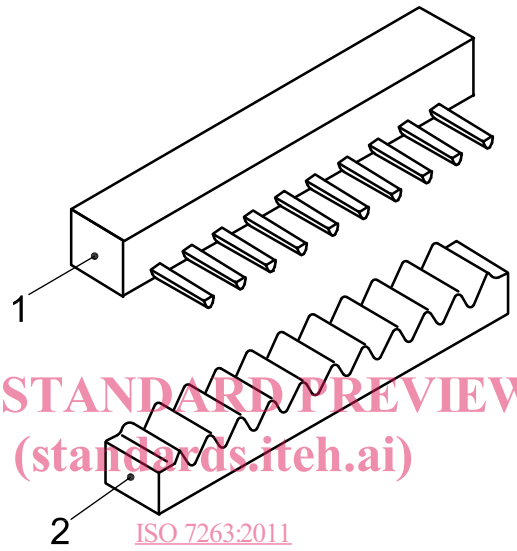
**5.3 Rack and comb**.

**5.3.1 Rack**, at least 19 mm wide with a profile corresponding to the teeth of the corrugating rolls.

The rack has nine full teeth and one incomplete tooth at each end so as to form 10 valleys. The tooth spacing is 8,55 mm ± 0,05 mm and the height of the teeth is 4,75 mm ± 0,05 mm. (See 2 in Figures 2 and 3.)

**5.3.2 Comb**, at least 19 mm wide with 10 prongs, 3,4 mm ± 0,1 mm high. (See 1 in Figures 2 and 3.)

The rack (5.3.1) and comb may be replaced with an automatic device, provided it can be demonstrated that this device will produce the same results.

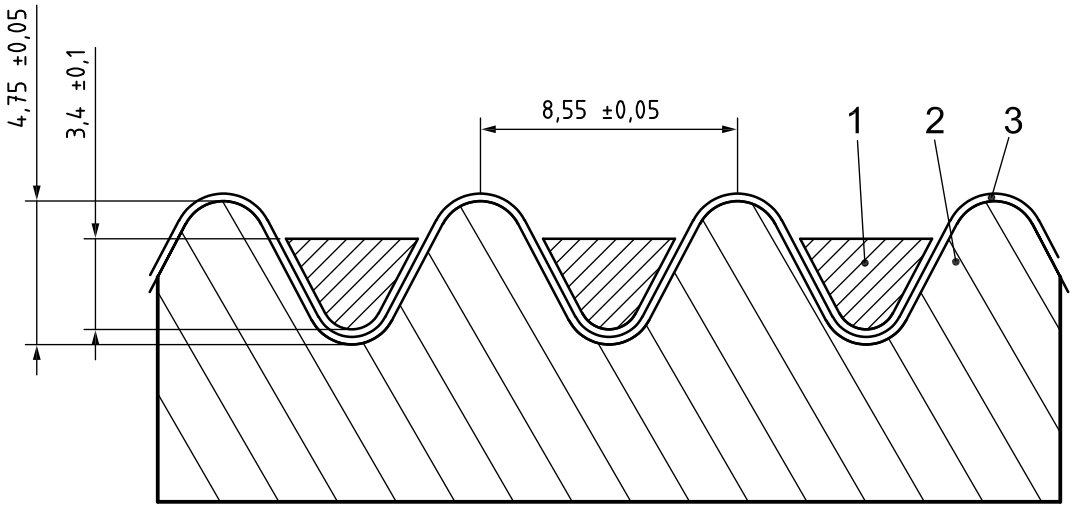





**Key**
1 comb
2 rack

**Figure 2 — Profile of comb and rack**

Dimensions in millimetres




**Key**
1 comb
2 rack
3 paper

**Figure 3 — Dimensions of comb and rack**