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

*Papier, carton et carton ondulé — Description et étalonnage du
matériel pour essai de compression*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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 second edition cancels and replaces the first edition (ISO 13820:1996), of which it constitutes a minor revision with the following changes:

- [4.1.2](#) has been updated;
- [5.1](#) has been updated.

Introduction

This International Standard describes the types of testing equipment available for carrying out compression tests on paper, board, and corrugated fibreboard. It describes two distinct types of instrument. The preferred instrument type, known as the fixed-platen compression tester, develops compressive forces at a constant rate of strain. The other, known as the beam-deflection compression tester, develops compressive forces between one platen driven at constant speed and another platen resting on a deformable beam. With this type neither rate of stress nor rate of strain is constant. The two instrument types give similar but not necessarily the same test results when used for compression tests; literature shows that the beam deflection machine produces results higher than those of the fixed-platen machine.^{[1][2][3]} The extent of the difference depends on the test being conducted and on the characteristics, particularly the elastic characteristics, of the material being tested.

The fixed-platen tester is preferred because of its better reliability, its ability to test over the range of test levels likely to be found, and because the characteristics of existing instruments have been well defined and universally accepted. The beam-deflection tester has been inadequately defined in past International Standards for compression tests; among existing instruments there have been different loading rates, different beam stiffnesses, and therefore different rates of strain. Furthermore, in some countries, the stiffness of beams commonly available is such that no one beam is appropriate for all the test levels likely to be found, so that it has been common practice to use two beams of different stiffnesses interchangeably to cover the full range of loads.

It is expected that the beam-deflection-type tester might be less commonly used in the future, and it can be withdrawn from this International Standard at a future revision.

The testing equipment referred to in this International Standard is used for tests described in ISO 3035^[1], ISO 3037^[2], ISO 7263^[3], and ISO 12192^[4].

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

1 Scope

This International Standard specifies the essential characteristics and the principles of calibration of compression testing equipment used in the testing of paper, board, and corrugated fibreboard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

3 Principle

The compression testing machine is calibrated against reference masses or other traceable standards.

4 Apparatus

4.1 Fixed-platen compression testing machine, operating on the constant rate of deformation (strain) principle and incorporating the following features.

4.1.1 An upper and a lower platen, each large enough to completely accommodate the test piece and sufficiently rigid to resist significant deformation by the compressive forces.

The platens shall be mounted so as to have not more than 0,05 mm relative movement in the horizontal plane and their surfaces shall be parallel to each other, within 0,05 mm per 100 mm of platen surface. The surface of the platens shall be flat to the extent that the lowest and highest points are within 0,05 mm of the average surface.

Some tests require the surface finish of the platen to be such as to prevent slippage of the test piece during the test. Emery cloth, grade 00 or its equivalent (type 240 in Europe, crocus cloth in Canada), secured to the surface of the platens with contact adhesive or with low-compressibility double-sided pressure-sensitive tape (see NOTE), or matte finish of the platen surfaces, or any equivalent means, can be used to achieve this, provided the requirements for parallelism are met.

The emery cloth shall be replaced as soon as any damage is observed. On no account should a knife or other sharp instrument be used to remove the emery cloth or other material adhering to the platens.

NOTE While compliance with ISO 7263 permits emery cloth to be used on the platen surfaces, other test methods do not. With ISO 3037, it is safer to avoid the use of emery cloth. However, it is common practice to use the same tester for tests which do and do not require emery cloth. The possibility of erroneous test results is sufficiently low to allow the use of emery cloth in all ISO test methods in which the use of this compression testing machine is now required, provided that a grade not coarser than 00 is used.

4.1.2 Means of moving one platen towards the other at a constant, controlled speed.

Different speeds are standard in different parts of the world, the most typical being $(12,5 \pm 0,25)$ mm/min and $(10,0 \pm 0,25)$ mm/min. As test values can be impacted by the strain rate of the applied load, it should