INTERNATIONAL STANDARD

ISO 13821

Second edition
2020-06

Corrugated fibreboard — Determination of edgewise crush resistance — Waxed edge method

Carton ondulé — Détermination de la résistance à la compression sur chant — Méthode du bord paraffiné

Reference number
ISO 13821:2020(E)

© ISO 2020



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **1**
5 Apparatus and test liquid **1**
6 Sampling **2**
7 Conditioning **3**
8 Preparation of test pieces **3**
8.1 General 3
8.2 Cutting the test pieces 3
8.3 Waxing 3
9 Procedure **4**
10 Calculation **4**
11 Precision **4**
11.1 General 4
11.2 Precision data from TAPPI-CTS 5
12 Test report **5**
Bibliography **6**

© ISO 2020 – All rights reserved

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.

This document was prepared by Technical Committee ISO/TC 6/SC 2, *Test methods and quality specifications for paper and board*.

This second edition cancels and replaces the first edition (ISO 13821:2002), of which it constitutes a minor revision.

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

— Introduction of an additional group in the Introduction clause;

— Information on sampling of corrugated shipping containers are added in Clause 6;

— Information in 8.2 on the height of the test pieces;

— Introduction of precision data based on TAPPI comparative testing service.

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.

© ISO 2020 – All rights reserved

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.

b) Those in which the edges of the test piece to which the force is applied are waxed to prevent the test result from 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 loading edges in order to induce the failure to occur away from those edges.

d) Those in which carefully cut rectangular pieces are tested with edges clamped to prevent the test result from being influenced by "edge effects".

The dimensions of the test piece vary from one group to the other and, in group c), the methods vary according to the shape and method of reducing the length.

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 document describes a method from group b) intended to be used for quality measurement and quality specification purposes. This particular method is selected because it correlates well with the top-to-bottom compression strength of the final transport package and provides significantly higher results than unwaxed methods (a) because edge effects are avoided.

© ISO 2020 – All rights reserved

Corrugated fibreboard — Determination of edgewise crush resistance — Waxed edge method

1 Scope

This document specifies a method for the determination of the edgewise crush resistance of corrugated fibreboard. The force is applied in the direction of the flute axis.

This method is applicable to single-wall (double-faced), double-wall, and triple-wall corrugated fibreboard. It may also be used to test samples taken from corrugated cases and other converted products.

While the method is applicable to waxed corrugated fibreboard, care must be taken that the heat used in the waxing step does not affect the corrugated structure. This is controlled by observing that failure during the test still occurs away from the loaded edges.

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*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

Subjection of a rectangular test piece of corrugated board placed between the platens of a crush tester, with the flutes perpendicular to the platens, to a compressive force until failure occurs. The loading edges of the test piece have been reinforced by paraffin to prevent premature failure at those edges when the load is applied.

Measurement of the maximum force sustained by the test piece.

5 Apparatus and test liquid

5.1 Motor-driven, platen-type compression testing machine. The apparatus described in ISO 13820 shall be used.

© ISO 2020 – All rights reserved