BRITISH STANDARD

BS EN ISO 2233:2001

Packaging — Complete, filled transport packages and unit loads — Conditioning for testing

The European Standard EN ISO 2233:2001 has the status of a British Standard

ICS 55.180.40

National foreword

This British Standard is the official English language version of EN ISO 2233:2001. It is identical with ISO 2233:2000. It supersedes BS EN ISO 2233:1999 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PKW/1, Packaging Generalities, to Subcommittee PKW/1/4, Test Methods, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this Subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 4, an inside back cover and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 September 2001

Amendments issued since publication

Amd. No.	Date	Comments

ISBN 0 580 37927 2

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 2233

July 2001

ICS 55.180.40

Supersedes EN ISO 2233:1999

English version

Packaging - Complete, filled transport packages and unit loads - Conditioning for testing (ISO 2233:2000)

Emballages - Emballages d'expédition complets et pleins et charges unitaires - Conditionnement en vue des essais (ISO 2233:2000)

Verpackung - Versandfertige Packstücke und Ladeeinheiten - Klimatische Vorbehandlung für die Prüfung (ISO 2233:2000)

This European Standard was approved by CEN on 9 June 2001.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 2233:2001 E

Foreword

The text of the International Standard from Technical Committee ISO/TC 122 "Packaging" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 261 "Packaging", the secretariat of which is held by AFNOR.

This European Standard replaces EN ISO 2233:1999.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2002, and conflicting national standards shall be withdrawn at the latest by January 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 2233:2000 has been approved by CEN as a European Standard without any modification.

EN ISO 2233:2001

INTERNATIONAL STANDARD

ISO 2233

Fourth edition
2000-03-01

Packaging — Complete, filled transport packages and unit loads — Conditioning for testing

Emballages — Emballages d'expédition complets et pleins et charges unitaires — Conditionnement en vue des essais

Reference number
ISO 2233:2000(E)

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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 2233 was prepared by Technical Committee ISO/TC 122, *Packaging*, Subcommittee SC 3, *Performance requirements and tests for means of packaging, packages and unit loads (as required by ISO/TC 122)*.

This fourth edition cancels and replaces the third edition (ISO 2233:1994), which has been technically revised.

Annex A forms a normative part of this International Standard.

Introduction

It is the responsibility of the user of this International Standard to establish appropriate health and safety practice in accordance with relevant legislation.

Packaging — Complete, filled transport packages and unit loads — Conditioning for testing

1 Scope

This International Standard specifies a method for the conditioning of complete, filled, transport packages and unit loads.

2 Term and definition

For the purposes of this International Standard, the following term and definition applies.

2.1
test specimen
a complete, filled transport package or unit load

3 Principle

The test specimen is exposed to predetermined atmospheric conditions for a predetermined period of time.

4 Atmospheric conditions

One or more of the conditions given in Table 1 shall be selected.

Table 1 — Atmospheric conditions

Condition	Temperature		Relative humidity
	°C	K	(RH) %
1	− 55	218	Not specified
2	− 35	238	Not specified
3	− 18	255	Not specified
4	+ 5	278	85
5	+ 20	293	65
6	+ 20	293	90
7	+ 23	296	50
8	+ 30	303	85
9	+ 30	303	90
10	+ 40	313	Uncontrolled
11	+ 40	313	90
12	+ 55	328	30

5 Tolerances

5.1 Temperature

5.1.1 Tolerance on peak values

For conditions 1, 2, 3 and 10, the maximum permissible temperature difference of ten measurements distributed about the nominal value over at least 1 h shall be ± 3 °C. For all other conditions the maximum permissible difference shall be ± 2 °C.

5.1.2 Tolerance on the mean

For all conditions, the tolerance on the mean in relation to the nominal value shall be ± 2 °C.

NOTE 1 When using condition 4, care should be taken to ensure that the dew point is not reached.

NOTE 2 Temperature tolerances quoted are not necessarily those required to maintain the required tolerances on relative humidity; closer temperature tolerances may therefore be necessary in order to comply with the tolerances required for relative humidity.

5.2 Relative humidity

5.2.1 Tolerance on peak values

For all conditions with a humidity requirement, the maximum permissible relative humidity difference of ten measurements distributed about the nominal value over at least 1 h shall be ± 5 % RH.

5.2.2 Tolerance on the mean

For all conditions, the tolerance on the mean in relation to the nominal value shall be ± 2 % RH.

NOTE 1 The mean value of relative humidity may be obtained by taking the average of a minimum of ten measurements over a period of 1 h, or may be derived from a continuous instrument trace.

NOTE 2 The tolerance of ± 5 % RH is quoted as this represents the maximum variation to be expected in conditioning chambers. Modern, well designed, conditioning chambers are capable of maintaining ± 2 % RH. The response of most test specimens to changes in atmospheric moisture is relatively slow compared with the fluctuations of relative humidity within the chamber and, provided that the relative humidity within the working space, taken over any 1 h period during the duration of the test, lies within ± 5 % of the specified relative humidity, it may be assumed that the wider fluctuations, such as may occur on opening the door, have had little effect on the moisture content of the package.

6 Apparatus

6.1 Conditioning chamber, having a working space the temperature and humidity of which is continuously recorded and which can be maintained at the specified conditions within the control tolerances given in clause 5.

The working space is that part of a conditioning chamber within which the specified controlled conditions are maintained. The boundaries of this space shall be specified for each chamber.

6.2 Drying chamber, if necessary, to reduce the moisture content of certain test specimens to below that which will be attained by conditioning.

6.3 Measuring and recording apparatus, sufficiently sensitive and stable to allow measurement of temperature to an accuracy of 0,1 °C and relative humidity to 1 %.

For the purposes of this International Standard, the record is deemed continuous if the period between individual readings is not greater than 5 min.

The recording equipment shall have sufficient speed of response to record accurately, to the precision stated above, changes in temperature of 4 °C per minute and changes in relative humidity of 5 % per minute.

7 Procedure

7.1 Select the temperature and relative humidity conditions most appropriate to the transport and storage of the test specimen to be tested. Place the test specimen within the working space of the conditioning chamber (6.1) and expose it to the specified conditions for a minimum period which shall be selected from 4 h, 8 h, 16 h, 24 h, 48 h or 72 h or from 1 week, 2 weeks, 3 weeks or 4 weeks.

7.2 Support the test specimen in such a way that the conditioning atmosphere has free access to the top, sides and at least 75 % of the base. The conditioning period is deemed to start 1 h after the specified conditions have been regained.

7.3 When the test specimen is constructed of materials, such as fibreboard, that are known to show a hysteresis effect in their characteristics, it may be necessary to pre-dry before conditioning. This shall be done by placing the test specimen for a minimum period of 24 h in the drying chamber (6.2) in conditions such that, when transferred to the test conditions, it will approach equilibrium by taking up moisture. This is not necessary when the specified relative humidity is 40 % or below.

8 Test report

The test report of tests on conditioned, complete, filled transport packages and unit loads, such as impact tests, stacking test and vibration tests, shall include the following information:

a) a reference to this International Standard;

b) the details of any pre-drying;

c) the conditions (see Table 1) and time used for conditioning;

d) the temperature and relative humidity of the test area at the time of test;

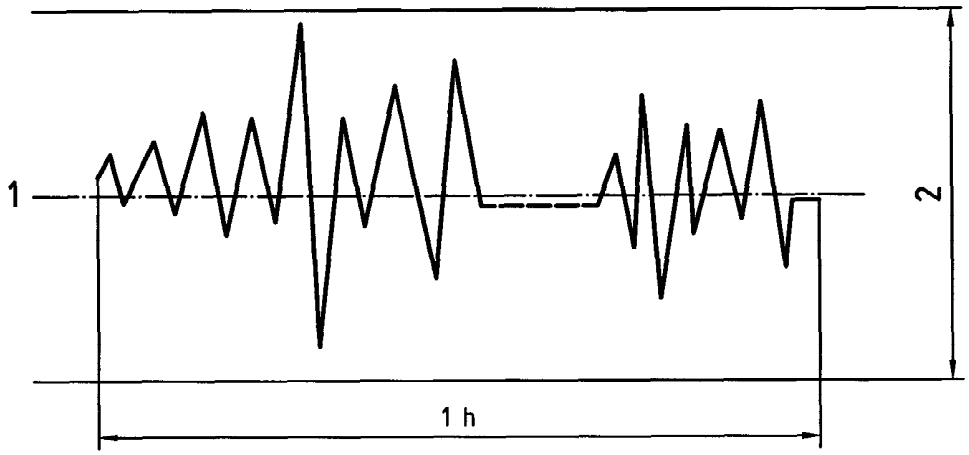
e) any deviation from this International Standard.

Annex A
(normative)

Relative accuracies of the measurement of temperature and relative humidity

A continuous record of temperature or relative humidity will show a cyclic variation. It is therefore necessary to determine precise values which define both the level and variation of these properties.

Consider the typical record given in Figure A.1.



Key
1 Nominal value
2 Tolerance interval

Figure A.1

All the extreme values shall be included in the specified peak-to-valley tolerance interval.

The mean of the extreme measurements shall be included in the tolerance interval specified for the mean value.

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