IS 7031 (2002): Method of Conditioning for Testing of Complete, Filled Transport Packages [TED 24: Transport Packages]

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(दूसरा पुनरीक्षण)

Indian Standard

METHOD OF CONDITIONING FOR TESTING OF COMPLETE, FILLED TRANSPORT PACKAGES

(Second Revision)

ICS 55.180.40

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 2002

Price Group 3

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Transport Packages and Packaging Codes Sectional Committee had been approved by the Transport Engineering Division Council.

This Indian Standard was first published in 1973 and its second revision had been taken to bring it in line with ISO 2233 : 2000 'Packaging — Complete, filled transport packages and unit loads — Conditioning for testing' issued by the International Organization for Standardization.

In this revision, following technical changes have been incorporated:

a) Concept of unit load has been added in the scope;
b) Clause on test report has been revised; and
c) Clause on control tolerances has been revised and new sub-clauses, such as 'tolerance on peak values' and 'tolerance on mean' for pararmeters like 'temperature' and 'relative humidity' have been included.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

Indian Standard

METHOD OF CONDITIONING FOR TESTING OF COMPLETE, FILLED TRANSPORT PACKAGES

(Second Revision)

1 SCOPE

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

2 TERMINOLOGY

For the purpoes of this standard, the following term and definition shall apply.

2.1 Test Specimen — A complete, filled transport package or unit load.

3 PRINCIPLE

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

4 ATMOSPHERIC CONDITIONS

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

Table 1 Atmospheric Conditions

(*Clause* 4.1)

Condition	Temperature		Relative Humidity (RH), percent
	°C	°K	
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 (*see* Annex A).

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.

NOTES

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

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 percent RH (*see* Annex A).

5.2.2 *Tolerance on the Mean*

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

NOTES

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

2 The tolerance of ± 5 percent 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 percent relative humidity. 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 percent of the specified relative humidity, it may be assumed that the wider fluctuations, such as may occur on opening the door, have little effect on the moisture content of the package.

6 APPARATUS

6.1 Conditioning Chamber

A 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 **5**.

6.1.1 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

A chamber to reduce the moisture content of certain test specimens to below that which will be attained by conditioning.

6.3 Measuring and Recording Apparatus

An equipment sufficiently sensitive and stable to allow measurement of temperature to an accuracy of 0.1°C and relative humidity to 1 percent.

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

6.3.2 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 percent 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, 8, 16, 24, 48 or 72 h, or from 1, 2, 3 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 percent of the base. The conditioning period is deemed to start 1h 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 will be necessary to pre-dry before conditioning. This shall be done by placing the test specemen 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 percent or below.

8 TEST REPORTS

The reports 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 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; and
e) any deviation from this standard.

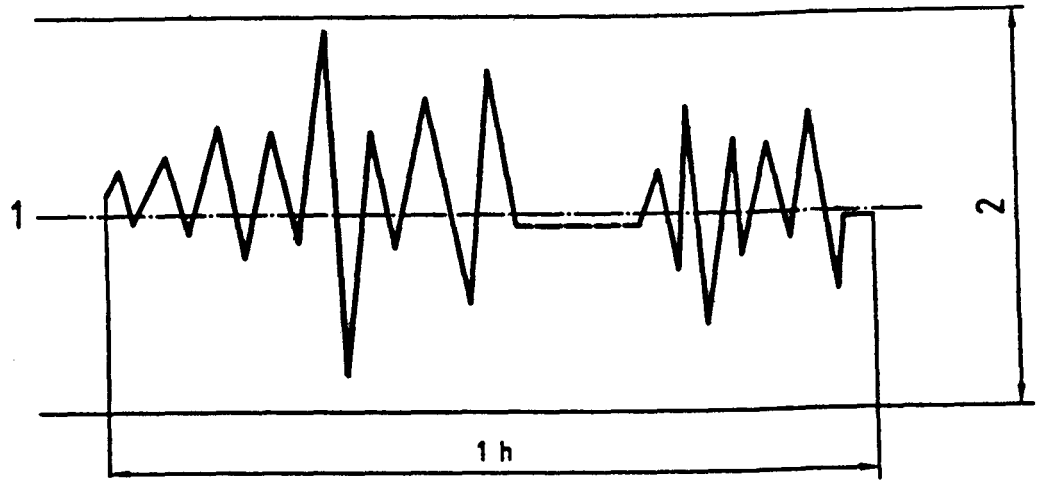
ANNEX A

(*Clauses* 5.1.1 *and* 5.2.1)

RELATIVE ACCURACIES OF THE MEASUREMENT OF TEMPERATURE AND RELATIVE HUMIDITY

A-1 A continuous record of temperature or relative humidity will show a cyclic variation. It is necessary to determine precise values which define both the level and variation of this property.

A-2 Consider the typical record illustrated below:



1 — Nominal value.
2 — Tolerance interval.

NOTES

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

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

ANNEX B

(Foreword)

COMMITTE COMPOSITION

Transport Packages and Packaging Codes Sectional Committee, TED 24

Organization	*Representative(s)*
Indian Institute of Packaging, Mumbai	SHRI P. V. NARAYANAN (***Chairman***)
Advance Packaging Pvt Ltd, Mumbai	SHRI DAMODAR SOMANI
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Association of State Road Transport Undertakings, New Delhi	DIRECTOR (ENGG) ASSISTANT DIRECTOR (TECHNICAL) (*Alternate*)
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Review of Indian Standards

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