IS 11239-3 (2009): Methods of Test for Rigid Cellular Thermal Insulation Materials, Part 3: Dimensional Stability [CHD 27: Thermal Insulation]

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IS 11239 (Part 3): 2009
ISO 2796 :1986

भारतीय मानक

दृढ़ जालीदार तापीय ऊष्मारोधी सामग्री की परीक्षण पद्धति

भाग 3 आयामीय स्थायित्व

(पहला पुनरीक्षण)

Indian Standard

METHOD OF TEST FOR RIGID CELLULAR THERMAL INSULATION MATERIALS

PART 3 DIMENSIONAL STABILITY

(First Revision)

ICS 83.100

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELH1110002

December 2009

Price Group 2

Thermal insulation Sectional Committee, CHD 27

NATIONAL FOREWORD

This Indian Standard (Part 3) (First Revision) which is identical with ISO 2796 :1986' Cellular plastics, rigid — Test for dimensional stability' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Thermal insulation Sectional Committee and approval of the Chemical Division Council.

This standard was originally published in 1985.This revision of the standard has been taken up to align it with ISO 2796 :1986 by adoption under dual numbering system.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to the following International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IS01923:1981 Cellular plastics and rubbers — Determination of linear dimensions	IS 11239 (Part 1): 2008 Method of test for rigid cellular thermal insulation materials: Part 1 Dimensions *{first revision)*	Identical

The technical committee responsible for the preparation of this standard has reviewed the provision of the following International Standard and has decided that this is acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 291 :1977	Plastics — Standard atmospheres for conditioning and testing

in reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values *(revised)'.*

Indian Standard

METHOD OF TEST FOR RIGID CELLULAR THERMAL INSULATION MATERIALS

PART 3 DIMENSIONAL STABILITY

(First Revision)

1 Scope and field of application

This international Standard specifies a method for the deter-mrnation of dimensional stability of rigid cellular plastics when subjected to specific conditions of temperature and relative humidity.

The method suggests a range of conditions from which one or more of the desired test conditions can be selected.

Additional conditions may be used as agreed upon by the purchaser and the supplier.

The term "dimensional stability of a rigid cellular plastic" implies the absence of irreversible change in dimensions in each of three directions perpendicular to each other when a test specimen of specified size is exposed to stated conditions for a specified period. In practice, such irreversible changes do occur and are measured by the method described in this international Standard.

2 References

ISO 291, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 1923, *Cellular plastics and rubbers Determination of linear dimensions.*

3 Principle

Determination of the changes of linear dimensions which occur when the test specimens have been subjected to specified en-vironments for a definite period of time and reconditioned.

4 Apparatus

4.1 Temperature or temperature and humidity con trolled chamber, capable of maintaining the test specimens within the specified conditions and within the limits specified in the procedure (7.2).

4.2 Measuring instruments, capable of measuring linear dimensions in accordance with ISO 1923.

5 Test specimens

5.1 Test specimens shall be machined or sawn from the sample so as to have a smooth surface free of cracks. Foam skins shall be removed, unless otherwise specified.

5.2 The dimensions of the test specimens shall be not less than the following values:

length: 100 ± 1 mm

width: 100 ± 1 mm

thickness: 25 ± 0,5 mm

5.3 A minimum of three test specimens for each sample shall be used under each set of chosen conditions.

6 Conditioning

The test specimens shall be conditioned in one of the standard atmospheres defined in ISO 291.

7 Procedure

7.1 Measure the length and width of each test specimen at the three positions shown in the figure, and the thickness at the five positions shown, using the appropriate methods described in ISO 1923.

7.2 Expose the set of test specimens to each set of conditions specified in the relevant specification. Alternatively, test conditions may be chosen among the following:

For use at dry conditions:

-55 ± 3°C
-25 ±3°C
-10 ± 3°C
± 3°C
+23 ± 2°C
+40 ± 2°C
+70 ± 2°C
+ 85 ± 2°C
+ 100 ± 3°C
+ 110 ± 3°C
+ 125 + 3 °C
+ 150 ± 3°C

For use at 90 to 100 % RH:

+40 ± 2°C
+70 ± 2°C

Test specimens shall be laid horizontally in the test chamber not (ess than 25 mm apart and on rigid wire mesh or perforated metal plate such that substantially free air circulation around the test specimens occurs.

The specimens shall not be exposed to the direct radiation from heating elements.

7.3 After 20 ± 1 h, remove the test specimens and recondition them for not less than 1 h and not more than 3 h in the same atmosphere as was used for conditioning.

7.4 Measure the length, width and thickness of the test specimens as indicated in 7.1. Examine the test specimens visually.

7.5 Without unnecessary delay, expose the test specimens again to the conditions previously used.

7.6 After a total exposure time of 48 ± 2 h, repeat the procedure described in 7.3 and 7.4.

7.7 If desired, re-expose the samples to the test conditions for total exposure times of 7 days and 28 days, and repeat the procedure described in 7.3 and 7.4.

8 Expression of results

8.1 Method of calculation

The percentage change in length is given by the formula

$$100 \times \frac{l_t - l_0}{l_0}$$

The percentage change in width is given by the formula

$$100 \times \frac{b_t - b_0}{b_0}$$

The percentage change in thickness is given by the formula

$$100 \times \frac{\delta_t - \delta_0}{\delta_0}$$

where

l_0, b_0 and S_0 are the mean initial dimensions and

l_t, b_x and $<5_t$ are the mean final dimensions after 20 h, 48 h, 7 days and 28 days.

8.2 Precision and accuracy

8.2.1 The precision and accuracy of this method are not known because collaborative interlaboratory data are not available.

8.2.2 The accuracy of the measuring instruments shall be as prescribed by ISO 1923.

9 Test report

The test report shall include the following information:

a) reference to this International Standard;

b) all particulars necessary for the identification of test specimens;

c) the conditioning procedure used;

d) the test conditions employed;

e) for each exposure period, the individual percentage change in length, width and thickness of each test specimen after test;

f) for each exposure period, the average of the percentage changes in length, width and thickness after test;

g) for each exposure period, comments on any visual distortion of the test specimens;

h) any procedures not specified in this International Standard;

i) any deviation, by agreement or otherwise, from the procedure specified.

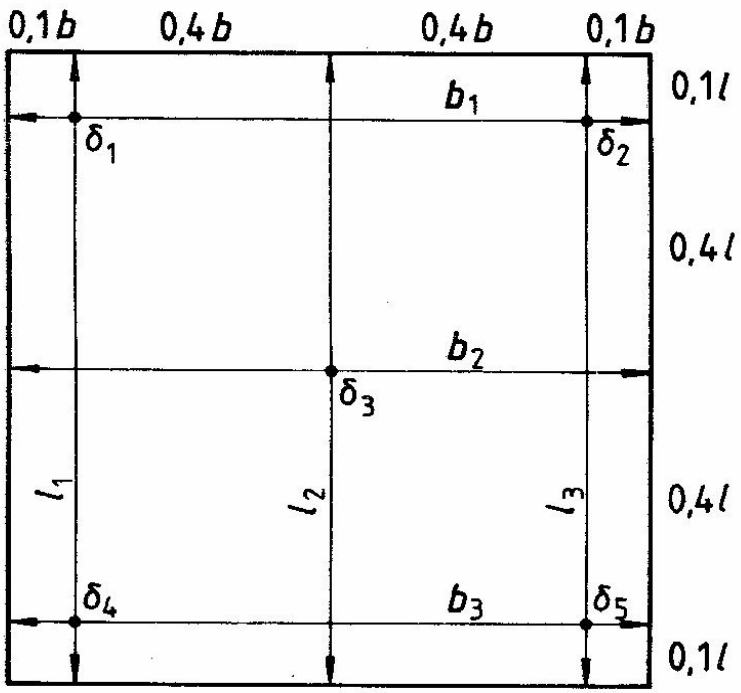

Figure — Positions for measuring dimensions

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This Indian Standard has been developed from Doc No.: CHD 27 (1533).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website:* www.bis.org.in

Regional Offices: *Telephones*

Central	:	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEWDELHt 110002	2323 7617 2323 3841
Eastern	:	1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	2337 8499, 2337 8561 2337 8626, 2337 9120
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PRINTED BY THE GENERAL MANAGER, GOVT. OF INDIA PRESS, NASHIK-422 006