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Thermal insulating products for building applications — Determination of linear dimensions of test specimens

Produits isolants thermiques destinés aux applications du bâtiment — Détermination des dimensions linéaires des éprouvettes

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Contents

Page

Foreword

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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 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 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 88, *Thermal insulating materials and products,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 29768:2008), which has been technically revised.

The main changes are as follows:

— Clause 2, Normative references, has been added and the following numbering of clauses has been changed accordingly;

— some editorial corrections.

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.

Thermal insulating products for building applications — Determination of linear dimensions of test specimens

1 Scope

This document specifies the characteristics and choice of measuring equipment and the procedure for determining the linear dimensions of test specimens that are taken from thermal insulating products. The procedures for measuring the dimensions of full-size products are specified in ISO 29465 and ISO 29466.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

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

3.1
linear dimension
distance between two points, between two parallel lines or between two parallel planes, defined by corners, edges or surfaces of the test specimen

3.2
test specimen
single item or part of an item used for a test

4 Principle

The linear dimensions of a test specimen are measured using an apparatus giving the required degree of accuracy.

5 Apparatus

Any test equipment which provides the same result with at least the same accuracy may be used.

5.1 Flat surface, larger than the largest dimensions of the test specimen.

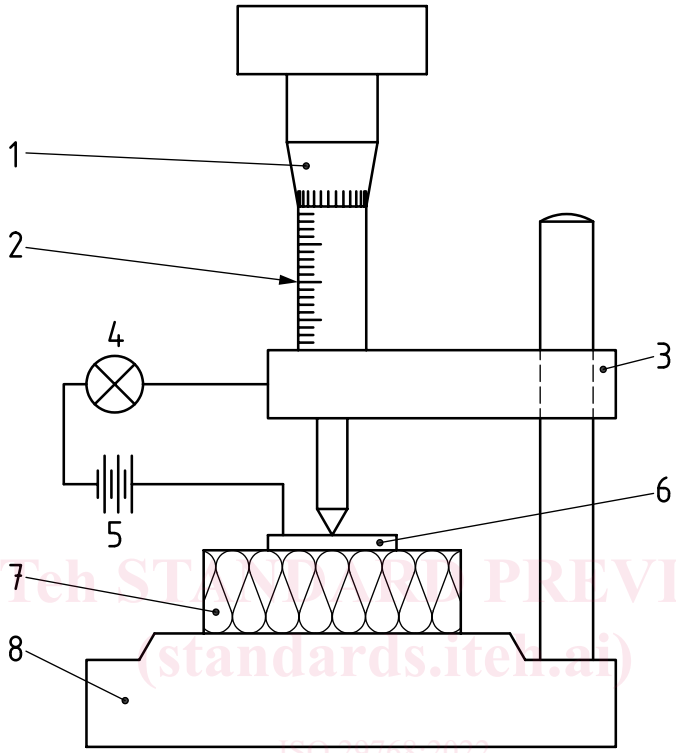
5.2 Dial gauge, allowing a reading to at least 0,05 mm.

The measuring surface shall be of such a size that the total resultant measuring pressure ≤1 kPa.

The measuring pressure of the dial gauge can be reduced by removing the spring. The dial gauge, or any other electrical or optical measuring instrument having at least the same accuracy, can be fixed to a device to adapt the testing equipment to the size of the test specimen.

5.3 Micrometer, allowing readings to at least 0,05 mm.

A micrometer shall be used only if it incorporates a device that indicates the onset of the force applied by the micrometer when it contacts the test specimen surface. An example of such a device is an electrical circuit, consisting of a flexible wire, battery, lamp and an aluminium plate exerting a pressure of (50 ± 1,5) Pa on the test specimen, as shown in Figure 1.



Key

1 screw micrometer
2 millimetre scale
3 adjustable support
4 lamp
5 battery
6 aluminium plate, 10 cm^2
7 test specimen
8 base plate

Figure 1 — Example of a suitable micrometer

5.4 Sliding caliper, allowing readings to at least 0,1 mm.

The sliding caliper shall be used only if it does not cause any deformation of the test specimen.

5.5 Metal rule or **metal tape**, graduated in millimetres and allowing a reading to at least 0,5 mm.

6 Test specimens

The number, dimensions and conditioning of test specimens shall be as defined in the relevant test method standard or the product standard or any other international specification.

In the absence of a product standard or any other technical specification, the number of specimens may be agreed between parties.

In tropical climates, different conditioning and testing conditions can be relevant. In this case, the conditions shall be (27 ± 2) °C and (65 ± 5) % RH and be clearly stated in the test report.

7 Procedure

7.1 Test conditions

The test conditions shall be as defined in the relevant test method standard or in the relevant product standard or in any other international specification.

In tropical climates, different conditioning and testing conditions can be relevant. In this case, the conditions shall be (27 ± 2) °C and (65 ± 5) % RH and be clearly stated in the test report.

7.2 Choice of measuring equipment

The choice of measuring equipment shall be in accordance with the required accuracy of the measured value as given in the relevant test method standard or the product standard or any other international specification. Where no such standard or specification exists, the required accuracy shall be agreed between parties, but it shall correspond to the dimensions being measured.

If the required accuracy of the dimension is expressed in millimetres, the choice of the equipment shall be as shown in Table 1.

Table 1 — Maximum permissible error expressed in millimetres

Maximum permissible error mm	Measuring equipment	Readings to the nearest mm	Resolution mm
0,1	dial gauge digital indicator or micrometer[a]	0,05	0,1
0,2	sliding caliper[b]	0,1	0,2
1,0	metal tape or rule[c]	0,5	1,0

[a] A dial gauge shall be used only if the result is unaffected by dial gauge pressure up to 1 kPa.

[b] A dial gauge or a micrometer may also be used, but then it is not necessary for the instrument accuracy to be better than that of a sliding caliper.

[c] A sliding caliper or even a dial gauge or micrometer may be used, but then it is not necessary for the instrument accuracy to be better than that of the metal tape or rule.

Table 2 shall be used to provide the means for the selection of the equipment used where the accuracy is expressed in percentage terms. The choice depends on both the required accuracy and on the test specimen's dimensions.

Table 2 — Maximum permissible error expressed in per cent

Maximum permissible error %	Measuring equipment/range of dimensions		
	20 mm to < 50 mm	50 mm to ≤ 100 mm	> 100 mm
0,5 to < 1	dial gauge or micrometer[a]	sliding caliper[b]	metal tape or rule[c]
1 to < 2	sliding caliper[b]	sliding caliper[b]	metal tape or rule[c]
≤ 2	sliding caliper[b]	metal tape or rule[c]	metal tape or rule[c]

[a] A dial gauge shall be used only if the result is unaffected by dial gauge pressure up to 1 kPa.

[b] A dial gauge or a micrometer may also be used, but then it is not necessary for the instrument accuracy to be better than that of a sliding caliper.

[c] A sliding caliper or even a dial gauge or micrometer may be used, but then it is not necessary for the instrument accuracy to be better than that of the metal tape or rule.

7.3 Number and location of measurements

The number of the measuring locations shall depend on the size and the shape of the test specimen but shall be at least two. The locations shall be as widely separated as possible, in order to give a good mean value.

If the median of three readings at each position is taken, the mean shall be calculated from the two or more median values.

7.4 Measurement with dial gauge

The measurement shall be made with the test specimen placed on a flat surface.

The measurements shall be made with and without the test specimen. The difference between the two measurements gives one reading.

All readings shall be made to the nearest 0,05 mm. The mean value calculated shall be rounded to the nearest 0,1 mm.

7.5 Measurement with micrometer

The measurement shall be made with the test specimen placed on a flat surface. The micrometer shall be fixed to an adjustable support (see Figure 1). The measuring point of the micrometer shall be screwed down continuously until it just touches the test specimen, as indicated by the surface contact device.

The measurements shall be made with and without the test specimen. The difference between the two measurements gives one reading.

All readings shall be made to the nearest 0,05 mm. The mean value calculated shall be rounded to the nearest 0,1 mm.

7.6 Measurement with a sliding caliper

The caliper shall be progressively preset to smaller measurements and presented to the test specimen until the setting is reached when the caliper measuring faces just touch the surface of the test specimen without causing any deformation.

All readings shall be made to the nearest 0,1 mm. The mean value calculated shall be rounded to the nearest 0,2 mm.

7.7 Measurement with metal rule or metal tape

The test specimen shall not be distorted or damaged by the application of the metal rule or metal tape.

All readings shall be made to the nearest 0,5 mm. The mean value calculated shall be rounded to the nearest 1 mm.

8 Calculation and expression of results

The calculation of results shall be as defined in Clause 7.

9 Accuracy of measurement

NOTE It has not been possible to include a statement on the accuracy of measurement in this document, but it is intended to include such a statement when this document is next revised.

10 Test report

The test report shall be as defined in the relevant test method standard, noting, if applicable, the use of the conditioning and testing conditions for tropical climates.

Bibliography

[1] ISO 29465, *Thermal insulating products for building applications — Determination of length and width*

[2] ISO 29466, *Thermal insulating products for building applications — Determination of thickness*