
**Thermal insulating products
for building applications —
Determination of thickness**

*Produits isolants thermiques destinés aux applications du bâtiment —
Détermination de l'épaisseur*





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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 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 29466:2008), 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;
- a reference to [Annex B](#) has been added in [Clause 4](#);
- the conditioning and testing conditions have been modified in [6.3](#) and [7.1](#);
- some editorial corrections have been made.

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 thickness

1 Scope

This document specifies the equipment and procedures for determining the thickness of full-size products. It is applicable to thermal insulating products.

This document provides the reference method. Other methods can be used (e.g. for quality control), provided a correlation has been established with this reference method; [Annex B](#) gives some examples of such methods.

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 thickness

d

linear dimension measured perpendicularly to the length and width plane

4 Principle

The distance is measured between a hard, flat reference surface on which the test specimen rests and a pressure plate resting freely on the top face of the specimen.

For products that can be penetrated or for rigid cellular foam products or rigid material, the test method shall be carried out as specified in [Annex B](#).

5 Apparatus

5.1 Measuring device, comprised of

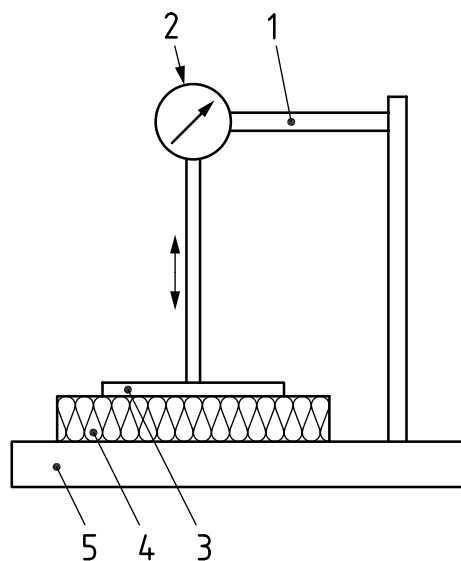
- a) a dial gauge, with a maximum permissible error of 0,5 mm and mounted on a rigid frame fastened to a flat rigid base plate that is at least as large as the test specimen;
- b) a square pressure plate, 200 mm square, which exerts a total pressure on the test specimen of either $(50 \pm 1,5)$ Pa or (250 ± 5) Pa (including the force exerted by the dial gauge).

If a higher accuracy is required, it is specified in the relevant product standard or agreed between parties.

An example of a suitable apparatus is given in [Figure 1](#).

The pressure shall be as given in the relevant product standard.

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



Key

- 1 rigid frame
- 2 dial gauge
- 3 square pressure plate
- 4 test specimen
- 5 flat rigid baseplate

Figure 1 — Example of an apparatus suitable for determining the thickness

6 Test specimens

6.1 Dimensions of test specimens

The test specimen shall be the full-size product, but it can be necessary to cut the product into pieces of appropriate size.

6.2 Number of test specimens

The number of test specimens shall be as specified in the relevant product standard.

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

6.3 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at $(23 \pm 5) ^\circ\text{C}$. In cases of dispute, they shall be stored at $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \%$ relative humidity (RH) for the time specified in the relevant product standard.

In tropical climates, different conditioning and testing conditions can be relevant. In this case, the conditions shall be $(27 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \%$ RH and be clearly stated in the test report.

6.4 Preparation of test specimens

Any facings or coatings shall be retained.

For compressed products, the preparation of test specimens shall be in accordance with [Annex A](#).

7 Procedure

7.1 Test conditions

The test shall be carried out at $(23 \pm 5) ^\circ\text{C}$. In case of dispute, it shall be carried out at $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \% \text{RH}$.

In tropical climates, different conditioning and testing conditions can be relevant. In this case, the conditions shall be $(27 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{RH}$ and be clearly stated in the test report.

7.2 Test procedure

Lay the test specimen carefully on the baseplate, ensuring that the measuring area is in contact with the baseplate. Test specimens faced or coated on one side shall be placed with the facing or coating against the baseplate. Place the pressure plate on the specimen, exerting a total pressure of either $(50 \pm 1,5) \text{ Pa}$ or $(250 \pm 5) \text{ Pa}$ at a designated position with the dial gauge centrally located.

Take two measurements for test specimens of lengths less than or equal to 600 mm, four measurements for test specimens greater than 600 mm and less than or equal to 1 500 mm in length, and one additional measurement for each additional 500 mm exceeding 1 500 mm in length.

Take the measurements d_1, d_2, \dots and d_n at positions on the surface, as shown in [Figure 2](#).

Measure to an accuracy in accordance with [5.1](#).

Dimensions in millimetres

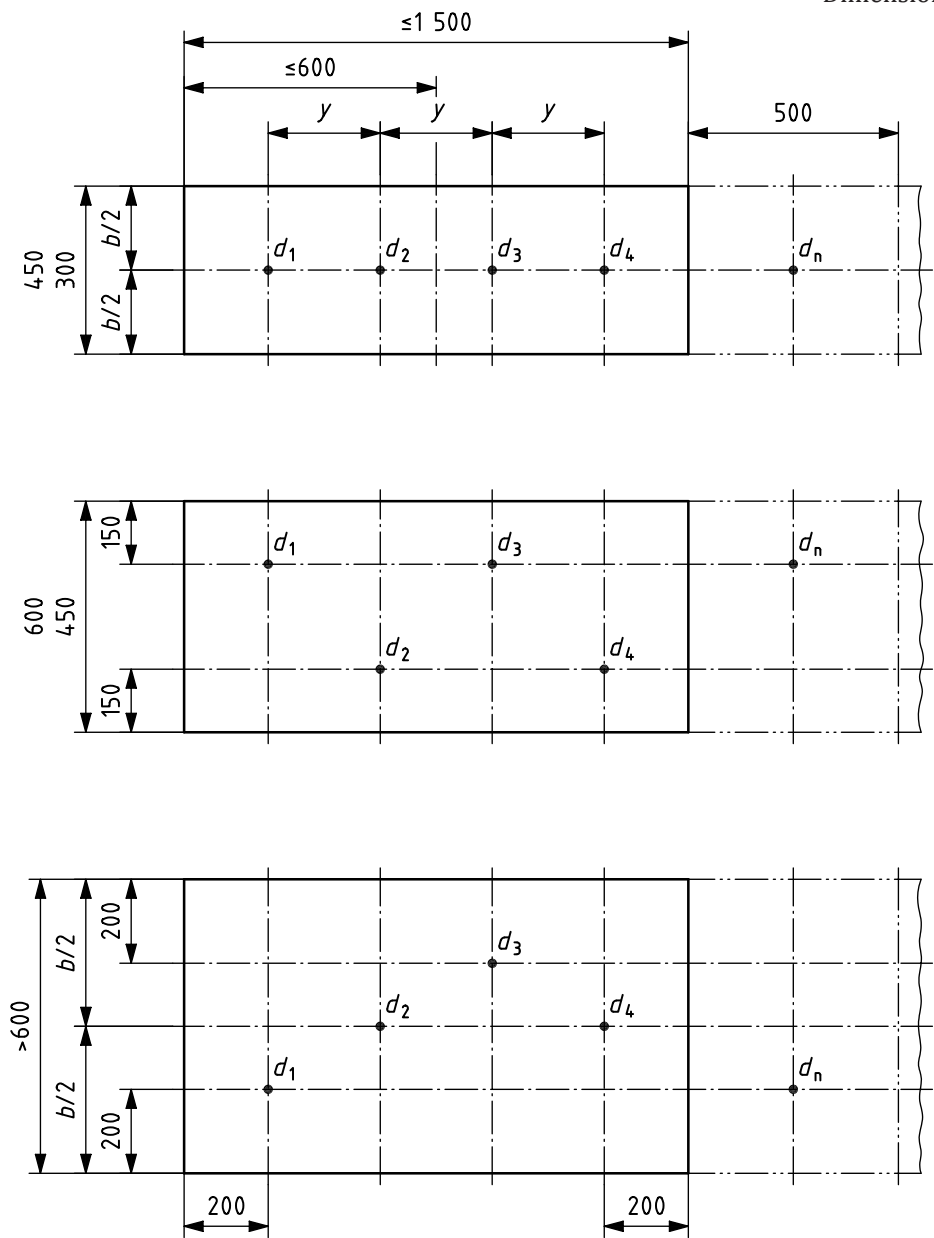


Figure 2 — Positions for measurements

8 Calculation and expression of results

The thickness of the test specimen shall be expressed in millimetres, to the nearest millimetre, as the mean value of the measurements made at all the points for the test specimen (see [Figure 2](#)).

If a higher accuracy is required, it is specified in the relevant product standard or agreed between parties.

9 Accuracy of measurement

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

10 Test report

The test report shall include the following information:

- a) reference to this document, i.e. ISO 29466:2022;
- b) product identification:
 - 1) product name, factory, manufacturer or supplier;
 - 2) production code number;
 - 3) type of product;
 - 4) packaging;
 - 5) form in which the product arrived at the laboratory;
 - 6) other information as appropriate, e.g. nominal density;
- c) test procedure:
 - 1) pre-test history and sampling (name of person taking the samples and sampling site);
 - 2) conditioning;
 - 3) deviations from [Clauses 6](#) and [7](#), if any;
 - 4) conditioning and testing conditions in tropical climates, if applicable;
 - 5) date of the test;
 - 6) general information relating to the test including the pressure;
 - 7) any occurrences that can have affected the results;
- d) results:
 - 1) all individual values and the mean value.

Annex A **(normative)**

Preparation of test specimens for compressed products

Before thickness measurements are taken, products that have been compressed in the package, and which in the package have a thickness of less than 90 % of the nominal thickness, shall be prepared in accordance with a) to d). Roll insulation shall be completely unrolled and cut into pieces 1 m to 1,5 m long. The first and last 0,5 m length of roll shall be discarded.

- a) Hold the piece vertically in both hands by a long edge so that the other long edge is approximately 450 mm above the floor.
- b) Drop the piece once so that it strikes the floor.
- c) Repeat operations a) and b) on the opposite edge for all specimens in the package and for all pieces cut from a roll.
- d) Wait at least 5 min for the pieces to reach a state of equilibrium before taking any measurements.

Annex B

(normative)

Examples of other methods for the determination of thickness

B.1 Pin-and-plate method

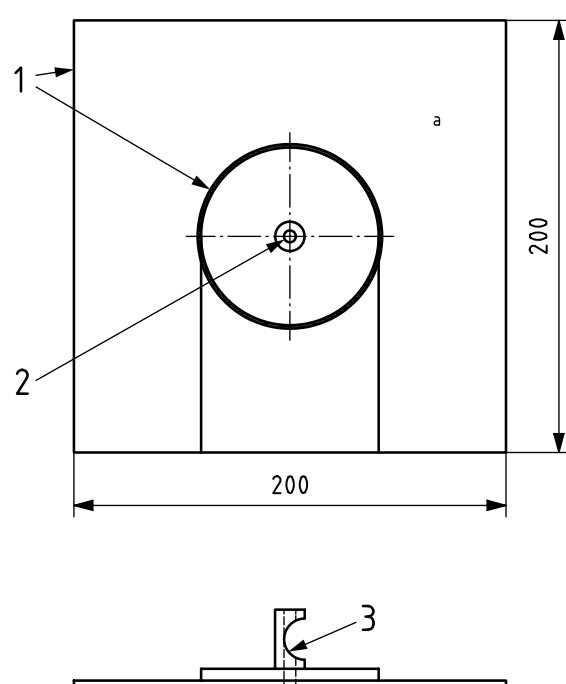
B.1.1 General

This method gives the same results with the same accuracy as the reference method, but only for those products that can be penetrated by the pin without changing the thickness of the product (see the relevant product standard).

B.1.2 Apparatus

B.1.2.1 Measuring equipment, consisting of

- a) a pressure plate, made from a transparent plastic or other suitable material, 200 mm square and fitted with a suitable thumb grip; the total mass of the plate and the grip shall be within the range of 198 g to 210 g so that it exerts a pressure of $(50 \pm 1,5)$ Pa (see [Figure B.1](#));
- b) a pin, made from 3 mm diameter steel rod, of sufficient length to penetrate the full thickness of the test specimen (see [Figure B.2](#)), with 20 mm of one end sharpened to a point;
- c) a metal rule, graduated in millimetres to allow readings to the nearest of 0,5 mm.

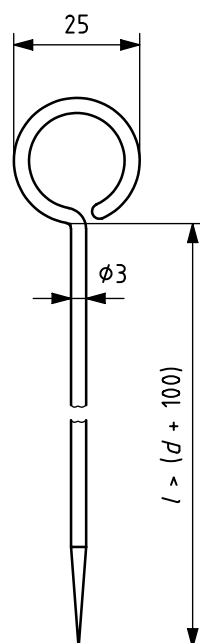


Dimensions in millimetres

Key

- 1 rigid plate
- 2 hole having a diameter suitable for sliding the pin perpendicular to plate
- 3 thumb grip
- ^a Mass between 198 g and 210 g [equivalent to $(50 \pm 1,5)$ Pa].

Figure B.1 — Pressure plate



Dimensions in millimetres

Figure B.2 — Pin

B.1.3 Procedure

Place the pressure plate on the designated measuring point, exerting a total pressure of $(50 \pm 1,5)$ Pa.

Force the pin with a rotary motion vertically downward through the specimen to the surface below.

Grasp the pin firmly at the thumb grip and remove both the pin and the plate. Measure the distance from the point of the pin to the plate. This distance is the thickness of the specimen at this point.

B.2 Dial gauge method

B.2.1 General

This method is applicable to rigid cellular foam products. It uses a dial gauge with a small contact plate that allows the detection of variations in thickness that can occur over small distances.

B.2.2 Apparatus

B.2.2.1 A dial gauge, with a maximum permissible error of 0,05 mm with a circular contact plate having an area of (650 ± 50) mm² equivalent to a diameter of $(28,8 \pm 1)$ mm and exerting a pressure of $(50 \pm 1,5)$ Pa or (250 ± 5) Pa.

B.2.3 Procedure

Take measurements at designated positions.

Product standards may specify alternative positions to those given in [Figure 2](#) of this document (position for measurement). For example, a large number of measurements can be required across the width of a board. It can be necessary to cut a board to get access to all points where a measurement is required.

B.3 Vernier caliper method

B.3.1 General

This method is suitable for some rigid products and for certain applications as the accuracy corresponds sufficiently to the product tolerances (see the relevant product standard).

As an example, vernier calipers may be used to measure the thickness of wood wool slabs or wood wool multilayer slabs.

B.3.2 Apparatus

B.3.2.1 A vernier caliper, having a leg length commensurate with the products being measured and, where appropriate, equipped with contact plates. The accuracy of the vernier caliper depends on the leg length.

B.3.3 Procedure

Take measurements at designated positions.

Product standards may specify alternative positions to those given in [Figure 2](#) of this document (position for measurement). For example, a large number of measurements can be required across the width of a board. It can be necessary to cut a board to get access to all points where a measurement is required.

