BS EN ISO 29470:2020

BSI Standards Publication

Thermal insulating products for building applications – Determination of the apparent density

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National foreword

This British Standard is the UK implementation of EN ISO 29470:2020. It is identical to ISO 29470:2020. It supersedes BS ISO 29470:2008, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/540/8, Mirror committee for CEN/TC 163 - Thermal Performance and Energy use in the Built Environment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Thermal insulating products for building applications - Determination of the apparent density (ISO 29470:2020)

Produits isolants thermiques destinés aux applications du bâtiment - Détermination de la masse volumique apparente (ISO 29470:2020)

Wärmedämmstoffe für das Bauwesen - Bestimmung der Rohdichte (ISO 29470:2020)

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European foreword

This document (EN ISO 29470:2020) has been prepared by Technical Committee ISO/TC 163 "Thermal performance and energy use in the built environment" in collaboration with Technical Committee CEN/TC 88 “Thermal insulating materials and products” the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2021, and conflicting national standards shall be withdrawn at the latest by January 2021.

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Endorsement notice

The text of ISO 29470:2020 has been approved by CEN as EN ISO 29470:2020 without any modification.

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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).

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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 29470:2008), which has been technically revised. The main changes compared to the previous edition are as follows:

— information was added to 6.1.

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.

INTERNATIONAL STANDARD ISO 29470:2020

Thermal insulating products for building applications — Determination of the apparent density

1 Scope

This document specifies the equipment and procedure for determining the apparent overall density and the apparent core density under reference conditions. This document is applicable to full size thermal insulating products and test specimens. This document can also be applied to the individual layers of multi-layered products.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

ISO 29768, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

3 Terms and definitions

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

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

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

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

3.1
apparent overall density
ρ_a
mass per unit volume of a product, including all surface skins formed during production, but excluding any facings and/or coatings

3.2
apparent core density
ρ_c
mass per unit volume of the core of a product after all surface skins formed during production and all facings and/or coatings have been removed

4 Principle

The density is determined as the ratio of the mass and the volume of the test specimen.

5 Apparatus

5.1 Balance, capable of determining the mass of a test specimen to an accuracy of 0,5 %.

5.2 Equipment, for the determination of linear dimensions (see 7.2).

6 Test specimens

6.1 Dimensions of test specimens

The test specimens shall be full-size products or parts of them or test specimens used for other tests.

The shape of the test specimens shall be such that their volume can be easily calculated.

When the apparent overall density is being determined using test specimens cut from a product with surface skins formed during production, the ratio of the area of the surface skin to the total volume for the test specimen shall be the same as the product.

When the shape or surface of the product is not rectangular and easy to measure and calculate, a representative piece of the product shall be cut out.

The size of a test specimen should be as large as possible, commensurate with the apparatus available and with the shape of the original product. The size of the test specimens may also be specified in other test methods.

6.2 Number of test specimens

The number of test specimens for full-size products shall be as specified in the relevant product standard. If test specimens from other tests are used, the number shall be as specified in the test method. If the number is not specified, then at least five test specimens shall be used.

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

6.3 Preparation of test specimens

The test specimens shall be cut using a method that does not change the original structure of the product.

The location from which the test specimens are taken shall be such that the density obtained is representative of the density of the product.

For determining the apparent overall density, any facings and/or coatings shall be removed from the product.

For determining the apparent core density, any surface skins formed during production and any facings and/or coatings shall be removed from the product.

When it is not possible to remove the facings and/or coatings without influencing the apparent density of the product, the mass of the facings and/or coatings shall be deducted by calculation.

NOTE Special methods of preparation, when needed, are given in the relevant product standard.

6.4 Conditioning of test specimens

The specimens shall be conditioned at (23 ± 2) °C and (50 ± 5) % relative humidity (RH) until constant mass is achieved.

The time for conditioning and the required accuracy of the constant mass measurements shall be given in the relevant product standard.

If it can be shown that temperature and humidity have negligible influence on the determination of the density, then the conditioning may be carried out at (23 ± 5) °C.

The conditioning time can be shortened by pre-drying the specimen in a ventilated oven at a prescribed temperature. Appropriate procedures may be given in the relevant product standard.

In tropical countries different conditioning and testing conditions may be more relevant. In such cases, the conditions shall be 27° C/65 % RH and be stated clearly in the test report.

7 Procedure

7.1 Test conditions

The test shall be carried out at (23 ± 2) °C and (50 ± 5) % RH.

If it can be shown that temperature and humidity have negligible influence on the determination of the density, testing may be carried out at (23 ± 5) °C.

In tropical countries different conditioning and testing conditions may be more relevant. In such cases, the conditions shall be (27 ± 2) °C/(65 ± 5) % RH and be stated clearly in the test report.

7.2 Test procedure

Measure the linear dimensions of full-size products in accordance with ISO 29465 and ISO 29466.

Measure the linear dimensions of specimens in accordance with ISO 29768.

For full-size products, the length, width and thickness shall be given to the nearest millimetre (mm). For specimens, the measurements shall be made to an accuracy of 0,5 %.

Calculate the volumes of the test specimens from these measurements.

Weigh each test specimen to an accuracy of 0,5 % and record its mass in kilograms (kg).

If the facings and/or coatings are retained, the mass of the product shall be calculated by deducting the mass of the facings and/or coatings and adhesives, if any, from the overall mass.

If a greater accuracy for dimensions of full-size products is needed, this shall be specified in the relevant product standard.

8 Calculation and expression of results

Calculate the apparent overall density, ρ_a, or apparent core density, ρ_c, in kg/m^3 as follows:

$$\rho = \frac{m}{V}$$

where

m is the mass of the test specimen, in kg;

V is the volume of the test specimen, in m^3.

ρ (ρ_a or ρ_c) for the specimen shall be given to three significant figures.

9 Test report

The test report shall include the following information:

a) a reference to this document (ISO 29470:2020);

b) product identification:

1) product name, factory, manufacturer, or supplier;

2) production code number;

3) type of product;

4) packaging;

5) the form in which the product arrived at the laboratory;

6) other information as appropriate (e.g. nominal dimensions);

c) test procedure:

1) pre-test history and sampling (e.g. who sampled, place of sampling);

2) conditioning;

3) drying conditions;

4) presence of facings, the mass of the facing and the method of removal, if necessary;

5) presence of surface skins and the method of removal, if necessary;

6) presence of densification, stratification or defects on the specimens;

7) any deviations from Clauses 6 and 7;

8) if applicable, conditioning and testing conditions in tropical countries;

9) date of testing;

10) general information relating to the test;

11) if the density was only determined on a part of the full-size product, information about shape and preparation of the test specimen and its original position in the original full-sized product shall be provided;

12) any events which could have affected the results, such as information regarding the apparatus and identity of the technician, are expected to be available in the laboratory but need not be recorded in the report;

d) results: all individual values and the mean value shall be reported.

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