BRITISH STANDARD

BS EN
13470:2001

Thermal insulating products for building equipment and industrial installations — Determination of the apparent density of preformed pipe insulation

The European Standard EN 13470:2001 has the status of a British Standard

ICS 91.100.60

National foreword

This British Standard is the official English language version of EN 13470:2001. This British Standard, together with BS EN 13467:2001, BS EN 13468:2001, BS EN 13469:2001, BS EN 13471:2001 and BS EN 13472:2001 partially supersedes BS 2972:1989.

The UK participation in its preparation was entrusted by Technical Committee RHE/9, Thermal insulating materials, to Subcommittee RHE/9/4, Nomenclature and specifications, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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This British Standard, having been prepared under the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 09 November 2001

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EUROPEAN STANDARD

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EN 13470

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English version

Thermal insulating products for building equipment and industrial installations - Determination of the apparent density of preformed pipe insulation

Produits isolants thermiques pour l'équipement du bâtiment et les installations industrielles - Détermination de la masse volumique apparente des coquilles isolantes préformées

Wärmedämmstoffe für die Haustechnik und für betriebstechnische Anlagen - Bestimmung der Rohdichte von vorgeformten Rohrdämmstoffen

This European Standard was approved by CEN on 18 August 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by 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 March 2002, and conflicting national standards shall be withdrawn at the latest by March 2002.

This European Standard is one of a series of standards which specify test methods for determining dimensions and properties of thermal insulating materials and products. It supports a series of product standards for thermal insulating materials and products which derive from the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (Directive 89/106/EEC) through the consideration of the essential requirements.

This European Standard has been prepared for products used to insulate building equipment and industrial installations, but it may also be applied to products used in other areas.

No existing European Standard is superseded.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the equipment and procedures for determining the apparent overall density and the apparent core density under reference conditions. It is applicable to full size thermal insulating products and test specimens of preformed pipe insulation.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13467, *Thermal insulating products for building equipment and industrial installations – Determination of dimensions, squareness and linearity of preformed pipe insulation.*

3 Terms and definitions

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

3.1
apparent overall density, ρ_a
the 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
the 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 quotient 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 the dimensions of preformed pipe insulation (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.

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 shall be the same for the test specimen as for the product.

NOTE The size of a test specimen should preferably 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 three test specimens shall be used.

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

6.3 Preparation of test specimens

The test specimens shall be cut by methods that do 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 test specimens shall be conditioned at (23 ± 2) °C and (50 ± 5) % relative humidity 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.

NOTE 1 If it can be shown that temperature and humidity has negligible influence on the determination of the density, then the conditioning can be carried out at (23 ± 5) °C.

NOTE 2 The conditioning time can be shortened by pre-drying the test specimen in a ventilated drying chamber at a prescribed temperature. Appropriate procedures may be given in the relevant product standard.

7 Procedure

7.1 Test conditions

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

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

7.2 Test procedure

Measure the linear dimensions of full size products and test specimens in accordance with EN 13467. 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 kilogrammes.
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 higher accuracy for dimensions of full size products is needed, it 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 kilogrammes per cubic metre using the equation:

$$\rho = \frac{m}{V} \tag{1}$$

where:

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

V is the volume of the test specimen, in cubic metres.

The calculation of V for a full size pipe insulation is made as follows:

$$V = l \times \frac{\pi}{4} \times (D_o^2 - D_i^2) \tag{2}$$

where:

l is the length of the test specimen, in metres;

D_o is the outside diameter, in metres;

D_i is the inside diameter, in metres.

ρ (ρ_a or ρ_c) for the test specimen is given to three significant figures.

Calculate the arithmetic mean value of the density from the results for all test specimens and express the value to three significant figures.

NOTE For some products the determination of the volume used for the calculation of the density of test specimens, with an irregular or complicated shape, can be made measuring the quantity of displaced water during the complete immersion in water at (23 ± 2) °C. In this case the mass should be determined before the volume determination.

9 Accuracy of measurement

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

10 Test report

The test report shall include the following information:

a) reference to this European Standard;

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 and where;
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 of the test specimens;
7) if any deviation from clauses 6 and 7;
8) date of testing;
9) general information relating to the test;
10) events which may have affected the results;

NOTE Information about the apparatus and identity of the technician should be available in the laboratory but it need not be recorded in the report.

d) results

all individual values and the mean value.

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389 Chiswick High Road
London
W4 4AL