	Stavebné prvky a konštrukcie **Tepelný odpor a súčiniteľ prechodu tepla** **Výpočtová metóda (ISO 6946: 2017)**	**STN** **EN ISO 6946**
STN		73 0559

Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946:2017)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/18

Obsahuje: EN ISO 6946:2017, ISO 6946:2017

Oznámením tejto normy sa ruší
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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN ISO 6946

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Supersedes EN ISO 6946:2007

English Version

Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946:2017)

Composants et parois de bâtiments - Résistance thermique et coefficient de transmission thermique - Méthodes de calcul (ISO 6946:2017)

Bauteile - Wärmedurchlasswiderstand und Wärmedurchgangskoeffizient - Berechnungsverfahren (ISO 6946:2017)

This European Standard was approved by CEN on 27 February 2017.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European Foreword

This document (EN ISO 6946:2017) 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 89 "Thermal performance of buildings and building components" the secretariat of which is held by SIS.

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 2018 and conflicting national standards shall be withdrawn at the latest by January 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document is part of the set of standards and accompanying technical reports on the energy performance of buildings and has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480, see reference [EF3] below).

Directive 2010/31/EU recasting the Directive 2002/91/EC on energy performance of buildings (EPBD, [EF4]) promotes the improvement of the energy performance of buildings within the European Union, taking into account all types of energy uses (heating, lighting, cooling, air conditioning, ventilation) and outdoor climatic and local conditions, as well as indoor climate requirements and cost effectiveness (Article 1).

The directive requires Member States to adopt measures and tools to achieve the prudent and rational use of energy resources. In order to achieve those goals, the EPBD requires increasing energy efficiency and the enhanced use of renewable energies in both new and existing buildings. One tool for this is the application by Member States of minimum requirements on the energy performance of new buildings and for existing buildings that are subject to major renovation, as well as for minimum performance requirements for the building envelope if energy-relevant parts are replaced or retrofitted. Other tools are energy certification of buildings, inspection of boilers and air-conditioning systems.

The use of European standards increases the accessibility, transparency and objectivity of the energy performance assessment in the Member States facilitating the comparison of best practices and supporting the internal market for construction products. The use of EPB standards for calculating energy performance, as well as for energy performance certification and the inspection of heating systems and boilers, ventilation and air-conditioning systems will reduce costs compared to developing different standards at national level.

The first mandate to CEN to develop a set of CEN EPBD standards (M/343, [EF1]), to support the first edition of the EPBD ([EF2]) resulted in the successful publication of all EPBD related CEN standards in 2007-2008.

Mandate M/480 was issued to review the mandate M/343 as the recast of the EPBD raised the need to revisit the standards and reformulate and add standards so that they become on the one hand unambiguous and compatible, and on the other hand a clear and explicit overview of the choices,

boundary conditions and input data that need to be defined at national or regional level. Such national or regional choices remain necessary, due to differences in climate, culture and building tradition, policy and legal frameworks. Consequently, the set of CEN EPBD standards published in 2007-2008 had to be improved and expanded on the basis of the recast of the EPBD.

The EPB standards are flexible enough to allow for necessary national and regional differentiation and facilitate Member States implementation and the setting of requirements by the Member States.

Further target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD article 11.9) and any other regional (e.g. pan European) parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

This document supersedes EN ISO 6946:2007.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

References:

[EF1]   EPBD, Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings

[EF2]   EPBD Mandate M/343, Mandate to CEN, CENELEC and ETSI for the elaboration and adoption of standards for a methodology calculating the integrated energy performance of buildings and estimating the environmental impact, in accordance with the terms set forth in Directive 2002/91/EC , 30 January 2004

[EF3]   Mandate M/480, Mandate to CEN, CENELEC and ETSI for the elaboration and adoption of standards for a methodology calculating the integrated energy performance of buildings and promoting the energy efficiency of buildings, in accordance with the terms set in the recast of the Directive on the energy performance of buildings (2010/31/EU), 14 December 2010

[EF4]   EPBD, Recast of the Directive on the energy performance of buildings (2010/31/EU). 14 December 2010

Endorsement notice

The text of ISO 6946:2017 has been approved by CEN as EN ISO 6946:2017 without any modification.

INTERNATIONAL STANDARD

ISO

6946

Third edition
2017-06

Building components and building elements — Thermal resistance and thermal transmittance — Calculation methods

Composants et parois de bâtiments — Résistance thermique et coefficient de transmission thermique — Méthodes de calcul

Reference number
ISO 6946:2017(E)

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

ISO 6946 was prepared by the ISO Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment,* Subcommittee SC 2*, Calculation methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 89, *Thermal performance of buildings and building components,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 6946:2007), which has been technically revised.

The changes in this third edition are mostly editorial. This document has been re-drafted according to CEN/TS 16629:2014.

Introduction

This document is part of a series aimed at the international harmonization of the methodology for assessing the energy performance of buildings. Throughout, this series is referred to as a "set of EPB standards".

All EPB standards follow specific rules to ensure overall consistency, unambiguity and transparency.

All EPB standards provide a certain flexibility with regard to the methods, the required input data and references to other EPB standards, by the introduction of a normative template in Annex A and Annex B with informative default choices.

For the correct use of this document, a normative template is given in Annex A to specify these choices. Informative default choices are provided in Annex B.

The main target groups for this document are architects, engineers and regulators.

Use by or for regulators: In case the document is used in the context of national or regional legal requirements, mandatory choices may be given at national or regional level for such specific applications. These choices (either the informative default choices from Annex B or choices adapted to national/regional needs, but in any case following the template of Annex A) can be made available as national annex or as separate (e.g. legal) document (national data sheet).

NOTE 1   So in this case:

— the regulators will specify the choices;

— the individual user will apply the document to assess the energy performance of a building, and thereby use the choices made by the regulators.

Topics addressed in this document can be subject to public regulation. Public regulation on the same topics can override the default values in Annex B. Public regulation on the same topics can even, for certain applications, override the use of this document. Legal requirements and choices are in general not published in standards but in legal documents. In order to avoid double publications and difficult updating of double documents, a national annex may refer to the legal texts where national choices have been made by public authorities. Different national annexes or national data sheets are possible, for different applications.

It is expected, if the default values, choices and references to other EPB standards in Annex B are not followed due to national regulations, policy or traditions, that:

— national or regional authorities prepare data sheets containing the choices and national or regional values, according to the model in Annex A. In this case a national annex (e.g. NA) is recommended, containing a reference to these data sheets;

— or, by default, the national standards body will consider the possibility to add or include a national annex in agreement with the template of Annex A, in accordance to the legal documents that give national or regional values and choices.

Further target groups are parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

More information is provided in the Technical Report (ISO/TR 52019-2)[1] accompanying this document.

The subset of EPB standards prepared under the responsibility of ISO/TC 163/SC 2 cover *inter alia*:

— calculation procedures on the overall energy use and energy performance of buildings;

— calculation procedures on the internal temperature in buildings (e.g. in case of no space heating or cooling);

— indicators for partial EPB requirements related to thermal energy balance and fabric features;

— calculation methods covering the performance and thermal, hygrothermal, solar and visual characteristics of specific parts of the building and specific building elements and components, such as opaque envelope elements, ground floor, windows and facades.

ISO/TC 163/SC 2 cooperates with other technical committees for the details on appliances, technical building systems, indoor environment, etc.

This document provides the means (in part) to assess the contribution that building products and services make to energy conservation and to the overall energy performance of buildings.

This document provides calculation methods for the thermal transmittance of walls and roofs

— to allow comparisons between different constructions,

— to help in judging compliance with regulations, and

— to provide input data for calculation of annual energy use for heating or cooling buildings.

Table 1 shows the relative position of this document within the set of EPB standards in the context of the modular structure as set out in ISO 52000-1.

NOTE 2   In ISO/TR 52000-2, the same table can be found, with, for each module, the numbers of the relevant EPB standards and accompanying technical reports that are published or in preparation.

NOTE 3   The modules represent EPB standards, although one EPB standard could cover more than one module and one module could be covered by more than one EPB standard, for instance, a simplified and a detailed method, respectively. See also Clause 2 and Tables A.1 and B.1.

Table 1 — Position of this document (*in casu* M2–5) within the modular structure of the set of EPB standards

Sub module	Overarching		Building (as such)		Technical Building Systems									
	Descriptions		Descrip-tions		Descrip-tions	Heat-ing	Cool-ing	Venti-lation	Hu-midifi-cation	Dehu-midifi-cation	Do-mestic hot water	Light-ing	Building automa-tion and control	PV, wind, ..
sub1		**M1**		**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
1	General		General		General									
2	Common terms and definitions; symbols, units and subscripts		Building en-ergy needs		Needs								a	
3	Applications		(Free) indoor conditions without systems		Maximum load and power									

^a   The shaded modules are not applicable.

Sub module	Overarching			Building (as such)			Technical Building Systems									
	Descriptions			Descriptions			Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic hot water	Lighting	Building automation and control	PV, wind, ..
sub1		M1			M2			M3	M4	M5	M6	M7	M8	M9	M10	M11
4	Ways to express energy performance			Ways to express energy performance			Ways to express energy performance									
5	Building categories and building boundaries			Heat transfer by transmission		ISO 6946	Emission and control									▒
6	Building occupancy and operating conditions			Heat transfer by infiltration and ventilation			Distribution and control									
7	Aggregation of energy services and energy carriers			Internal heat gains			Storage and control			▒	▒	▒		▒		
8	Building zoning			Solar heat gains			Generation and control									
9	Calculated energy performance			Building dynamics (thermal mass)			Load dispatching and operating conditions			▒	▒	▒		▒		▒
10	Measured energy performance			Measured energy performance			Measured energy performance									
11	Inspection			Inspection			Inspection									

[a] The shaded modules are not applicable.

Table 1 *(continued)*

Sub module	Overarching Descriptions	M1	Building (as such) Descriptions	M2	Technical Building Systems Descriptions	Heating M3	Cooling M4	Ventilation M5	Humidification M6	Dehumidification M7	Domestic hot water M8	Lighting M9	Building automation and control M10	PV, wind, .. M11
sub1		M1		M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
12	Ways to express indoor comfort				BMS									
13	External environment conditions													
14	Economic calculation													
a The shaded modules are not applicable.														

INTERNATIONAL STANDARD ISO 6946:2017(E)

Building components and building elements — Thermal resistance and thermal transmittance — Calculation methods

1 Scope

This document provides the method of calculation of the thermal resistance and thermal transmittance of building components and building elements, excluding doors, windows and other glazed units, curtain walling, components which involve heat transfer to the ground, and components through which air is designed to permeate.

The calculation method is based on the appropriate design thermal conductivities or design thermal resistances of the materials and products for the application concerned.

The method applies to components and elements consisting of thermally homogeneous layers (which can include air layers).

This document also provides an approximate method that can be used for elements containing inhomogeneous layers, including the effect of metal fasteners, by means of a correction term given in Annex F. Other cases where insulation is bridged by metal are outside the scope of this document.

NOTE   Table 1 in the Introduction shows the relative position of this document within the set of EPB standards in the context of the modular structure as set out in ISO 52000-1.

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 7345, *Thermal insulation — Physical quantities and definitions*

ISO 10211, *Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations*

ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

ISO 13789, *Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method*

ISO 52000-1:2017, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures*

NOTE 1   Default references to EPB standards other than ISO 52000-1 are identified by the EPB module code number and given in Annex A (normative template in Table A.1) and Annex B (informative default choice in Table B.1).

EXAMPLE   EPB module code number: M5–5, or M5–5,1 (if module M5–5 is subdivided), or M5–5/1 (if reference to a specific clause of the standard covering M5–5).

NOTE 2   In this document, there are no choices in references to other EPB standards. The sentence and note above is kept to maintain uniformity between all EPB standards.

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky