

# **SLOVENSKI STANDARD**

## **SIST EN ISO 10077-2:2017**

**01-september-2017**

**Nadomešča:**

**SIST EN ISO 10077-2:2012**

**SIST EN ISO 10077-2:2012/AC:2012**

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**Toplotne značilnosti oken, vrat in polken - Izračun toplotne prehodnosti - 2. del:  
Računska metoda za okvirje (ISO 10077-2:2017)**

Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames (ISO 10077-2:2017)

**iTeh STANDARD PREVIEW**

Wärmetechnisches Verhalten von Fenstern, Türen und Abschlüssen - Berechnung des Wärmedurchgangskoeffizienten - Teil 2: Numerisches Verfahren für Rahmen (ISO 10077-2:2017)

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Performance thermique des fenêtres, portes et fermetures - Calcul du coefficient de transmission thermique - Partie 2 : Méthode numérique pour les encadrements (ISO 10077-2:2017)

**Ta slovenski standard je istoveten z: EN ISO 10077-2:2017**

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**ICS:**

91.060.50	Vrata in okna	Doors and windows
91.120.10	Toplotna izolacija stavb	Thermal insulation of buildings

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**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 10077-2**

July 2017

ICS 91.060.50; 91.120.10

Supersedes EN ISO 10077-2:2012

English Version

**Thermal performance of windows, doors and shutters -  
Calculation of thermal transmittance - Part 2: Numerical  
method for frames (ISO 10077-2:2017)**

Performance thermique des fenêtres, portes et  
fermetures - Calcul du coefficient de transmission  
thermique - Partie 2 : Méthode numérique pour les  
encadrements (ISO 10077-2:2017)

Wärmetechnisches Verhalten von Fenstern, Türen und  
Abschlüssen - Berechnung des  
Wärmedurchgangskoeffizienten - Teil 2: Numerisches  
Verfahren für Rahmen (ISO 10077-2:2017)

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 10777-2:2017) has been prepared by Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS, in collaboration with Technical Committee ISO/TC 163 "Thermal performance and energy use in the built environment".

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 on the energy performance of buildings (the set of EPB standards) 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 [EF1] below), and supports essential requirements of EU Directive 2010/31/EC on the energy performance of buildings (EPBD, [EF2]).

In case this standard 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, in particular for the application within the context of EU Directives transposed into national legal requirements.

Further target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD art.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 10077-2:2012.

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

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] Mandate M480, 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) of 14th December 2010

**EN ISO 10777-2:2017 (E)**

[EF2] EPBD, Recast of the Directive on the energy performance of buildings (2010/31/EU) of 14<sup>th</sup> December 2010

**Endorsement notice**

The text of ISO 10777-2:2017 has been approved by CEN as EN ISO 10777-2:2017 without any modification.

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# INTERNATIONAL STANDARD

**ISO  
10077-2**

Third edition  
2017-06

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## **Thermal performance of windows, doors and shutters — Calculation of thermal transmittance —**

### **Part 2: Numerical method for frames**

**iTeh STANDARD PREVIEW**  
*Performance thermique des fenêtres, portes et fermetures — Calcul  
du coefficient de transmission thermique —  
(standards.iteh.ai) Partie 2: Méthode numérique pour les encadrements*

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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](http://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](http://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](http://www.iso.org/iso/foreword.html).

ISO 10077-2 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 89, *Thermal performance of buildings and building components*, in collaboration with ISO Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 2, *Calculation methods*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 10077-2:2012), which has been technically revised to comply with the requirements for the EPB set of standards. It also incorporates the Technical Corrigendum ISO 10077-2:2012/Cor 1:2012.

In addition, [Clause 6](#) has been technically revised by

- adding a new approach for the treatment of cavities,
- separating conduction/convection and radiation, and
- introducing the radiosity method.

[Annex H](#) and [Annex G](#) were also added.

A list of all parts in the ISO 10077 series can be found on the ISO website.

## ISO 10077-2:2017(E)

## 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 ISO 52000-1 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 this [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](#) of this document. 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 52022-2) accompanying this document.

The framework for overall EPB includes:

- a) common terms, definitions and symbols;
- b) building and assessment boundaries;
- c) building partitioning into space categories;

- d) methodology for calculating the EPB (formulae on energy used, delivered, produced and/or exported at the building site and nearby);
- e) a set of overall formulae and input-output relations, linking the various elements relevant for the assessment of the overall EPB;
- f) general requirements for EPB dealing with partial calculations;
- g) rules for the combination of different spaces into zones;
- h) performance indicators;
- i) methodology for measured energy performance assessment.

ISO 10077 consists of two parts. This document is intended to provide calculated values of the thermal characteristics of frame profiles, suitable for use as input data in the calculation method of the thermal transmittance of windows, doors and shutters given in ISO 10077-1. It is an alternative to the hot box test method specified in EN 12412-2. In some cases, the hot box method can be preferred, especially if physical and geometrical data are not available or if the profile is of complicated geometrical shape.

Although the method in this document basically applies to vertical frame profiles, it is an acceptable approximation for horizontal frame profiles (e.g. sill and head sections) and for products used in sloped positions (e.g. roof windows). For calculations made with the glazing units in place, the heat flow pattern and the temperature field within the frame are useful by-products of this calculation.

The ISO 10077 series does not cover building facades and curtain walling, which are covered in ISO 12631.

[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.

## ISO 10077-2:2017(E)

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

Overarching			Building (as such)		Technical building systems									
Sub module	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
1	General		General		General									
2	Common terms and definitions, symbols, units and subscripts		Building energy needs		Needs								a	
3	Applications		(Free) Indoor conditions without systems		Maximum load and power									
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 10077-2	Emission and control									
6	Building occupancy 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									

<sup>a</sup> The shaded modules are not applicable.

Table 1 (continued)

	Overarching		Building (as such)		Technical building systems									
Sub module	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
10	Measured energy performance		Measured energy performance		Measured energy performance									
11	Inspection		Inspection		Inspection									
12	Ways to express indoor comfort				BMS									
13	External environment conditions													
14	Economic calculation													
<sup>a</sup> The shaded modules are not applicable.														

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