



# SLOVENSKI STANDARD SIST EN 17423:2021

01-januar-2021

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## Energijske lastnosti stavb - Določanje in poročanje o faktorjih primarne energije (PEF) in emisijskem koeficientu CO<sub>2</sub> - Splošna načela - Modul M1-7

Energy performance of buildings - Determination and reporting of Primary Energy Factors (PEF) and CO<sub>2</sub> emission coefficient - General Principles, Module M1-7

Energieeffizienz von Gebäuden - Bestimmung und Berichterstattung von Primärenergiefaktoren (PEF) und CO<sub>2</sub>-Emissionsfaktoren

Performance énergétique des bâtiments - Détermination et déclaration des facteurs d'énergie primaire (PEF) et du coefficient d'émission de CO<sub>2</sub> - Principes généraux, Module M1-7

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### ICS:

13.040.01	Kakovost zraka na splošno	Air quality in general
91.120.10	Toplotna izolacija stavb	Thermal insulation of buildings

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**en,fr,de**

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EUROPEAN STANDARD

EN 17423

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2020

ICS 13.040.01; 91.120.10

English Version

## Energy performance of buildings - Determination and reporting of Primary Energy Factors (PEF) and CO<sub>2</sub> emission coefficient - General Principles, Module M1-7

Performance énergétique des bâtiments -  
Détermination et déclaration des facteurs d'énergie  
primaire (PEF) et du coefficient d'émission de CO<sub>2</sub> -  
Principes généraux, Module M1-7

Energieeffizienz von Gebäuden - Bestimmung und  
Berichterstattung von Primärenergiefaktoren (PEF)  
und CO<sub>2</sub>-Emissionsfaktoren

This European Standard was approved by CEN on 4 October 2020.

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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.

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

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## European foreword

This document (EN 17423:2020) has been prepared by Technical Committee CEN/TC 371 “Energy Performance of Buildings project group”, the secretariat of which is held by NEN.

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 May 2021, and conflicting national standards shall be withdrawn at the latest by May 2021.

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.

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**EN 17423:2020 (E)****Introduction**

This document belongs to a series of standards aiming at international harmonization of the methodology for the assessment of the energy performance of buildings.

For the correct use of this document, a normative template is given in Annex A to report the choices.

The target group of this document are all the users of the set of standards related to the assessment of the energy performance of buildings and especially national standardization experts or building authorities who are in charge of defining the PEFs and CO<sub>2</sub> emission coefficients.

In view of the complexity of the issue, the need for contextual knowledge and practicality of use, it is useful to mention necessary comments and explanations directly in the standard, and not to prepare a separate CEN/TR (Technical Report). For the same reasons, parts taken from other standards are appropriate to have in this document.

The document can be applied for different time intervals (annual, monthly, hourly).

This document is a new standard.

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## 1 Scope

This document provides a transparent framework for reporting on the choices related to the procedure to determine primary energy factors (PEFs) and CO<sub>2</sub> emission coefficients for energy delivered to and exported from the buildings as described in EN ISO 52000-1.

This document specifies the choices to be made to calculate the PEF(s) and CO<sub>2</sub> emission coefficients related to different energy carriers. PEFs and CO<sub>2</sub> emission coefficients for exported energy can be different from those chosen for delivered energy.

This document is primarily intended for supporting and complementing EN ISO 52000-1, as the latter requires values for the PEFs and CO<sub>2</sub> emission coefficients to complete the EPB calculation. But it can also be used for other applications.

**NOTE** The CO<sub>2</sub> emission coefficients allow calculating greenhouse gas emissions. According to the choices made, the CO<sub>2</sub> emission coefficients represent only CO<sub>2</sub> emissions or also other greenhouse gases.

Table 1 shows the position (marked by “X”) of this document within the modular structure as set out in EN ISO 52000-1.

The modules represent EPB standards, although one EPB standard may cover more than one module and one module may be covered by more than one EPB standard, for instance a simplified and a detailed method respectively.

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## EN 17423:2020 (E)

Table 1 — Position of this document (M1-7), within the modular structure as set out in EN ISO 52000-1

	Overarching	Building (as such)	Technical Building Systems										
Submodule	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										
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	Emission and control										
6	Building Occupancy and Operating Conditions	Heat Transfer by Infiltration and Ventilation	Distribution and control										



	Overarching	Building (as such)	Technical Building Systems										
Submodule	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
7	Aggregation of Energy Services and Energy Carriers	X	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									
12	Ways to Express Indoor Comfort			BMS									
13	External Environment Conditions												
14	Economic Calculation												

The shaded modules are not applicable.

**EN 17423:2020 (E)****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.

EN 15316-4-5, *Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-5: District heating and cooling, Module M3-8-5, M4-8-5, M8-8-5, M11-8-5*

EN ISO 7345, *Thermal performance of buildings and building components - Physical quantities and definitions (ISO 7345)*

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

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN ISO 7345, EN ISO 52000-1 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

**3.1 primary energy**

energy that has not been subjected to any conversion or transformation process

Note 1 to entry: Primary energy may be related to non-renewable energy and renewable energy. If both are taken into account, it is called "total primary energy".

[SOURCE: EN ISO 52000-1:2017, 3.4.29, modified note – "includes" is replaced by "may be related to"]

**3.2 energy carrier**

substance or phenomenon that can be used to produce mechanical work, electricity or thermal energy or to operate chemical or physical processes

[SOURCE: EN ISO 52000-1:2017, 3.4.9, modified – "or heat" has been replaced by "electricity or thermal energy".]

**3.3 primary energy factor**

ratio of the primary energy to the energy delivered to or exported from the assessment boundary

Note 1 to entry: primary energy factor can refer to the total primary energy or to the renewable, or non-renewable primary energy. To be more precise it should be specified (e.g. non-renewable primary energy factor).

**3.3.1 non-renewable primary energy factor for delivered energy carrier**

non-renewable primary energy for a given energy carrier, including the delivered energy and the considered non-renewable energy overheads of delivery to the points of use, divided by the delivered energy

[SOURCE: EN ISO 52000-1:2017, 3.5.17 modified – the term is completed by "for delivered energy carrier" and in the definition "non-renewable" is added before "energy overhead"]

**3.3.2****non-renewable primary energy factor for exported energy carrier**

non-renewable primary energy for a given energy carrier, including the exported energy and the considered non-renewable energy overheads of producing and exporting to the collection points, divided by the exported energy

**3.3.3****renewable primary energy factor for delivered energy carrier**

renewable primary energy for a given energy carrier, including the delivered energy and the considered renewable energy overheads of delivery to the points of use, divided by the delivered energy

[SOURCE: EN ISO 52000-1:2017, 3.5.21, modified – the term is completed by “for delivered energy carrier” and in the definition for “an energy carrier” the words “distant or nearby” have been deleted.]

**3.3.4****renewable primary energy factor for exported energy carrier**

renewable primary energy for a given energy carrier including the exported energy and the considered renewable energy overheads of producing and exporting to the collection points, divided by the exported energy

**3.3.5****total primary energy factor**

sum of non-renewable and renewable PEFs for a given energy carrier

[SOURCE: EN ISO 52000-1:2017, 3.5.25]

**3.4****CO<sub>2</sub> emission coefficient**

coefficient that describes the amount of CO<sub>2</sub> that is released from doing a certain activity

EXAMPLE Burning one tonne of fuel in a furnace is an example of application.

Note 1 to entry: The CO<sub>2</sub> emission coefficient can also include the equivalent emissions of other greenhouse gases (e.g. methane). To be more precise it should be specified by adding “equivalent” (e.g. CO<sub>2</sub> eq).

[SOURCE: EN ISO 52000-1:2017, 3.5.4, modified – The original note 1 and note 2 have been deleted. In note 3 the second sentence has been added.]

**3.5****assessment boundary**

boundary where the delivered and exported energy carriers are measured or calculated

Note 1 to entry: The term “building” in this document is used to mean “whatever is inside the assessment boundary”.

[SOURCE: EN ISO 52000-1:2017, 3.4.2, modified – “energy” has been replaced by “energy carriers”. Note 1 has been added]

**3.6****energy flow**

quantity of energy going from the energy source to the energy use

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## 3.7

**greenhouse gas**

gas, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds

Note 1 to entry: Greenhouse gas may have natural and anthropogenic origins.

[SOURCE: EN ISO 14067:2018, 3.1.2.1, modified – “gaseous constituent of the atmosphere” is simplified into “gas”. The notes have been deleted, because they are not of interest for the application of the term here Note 1 used to be part of the definition.]

## 3.8

**biogenic carbon**

carbon derived from biomass

[SOURCE: EN ISO 14067:2018, 3.1.7.2]

## 3.9

**fossil carbon**

carbon that is contained in fossilized material

Note 1 to entry: Examples of fossilized material are coal, oil, natural gas and peat.

[SOURCE: EN ISO 14067:2018, 3.1.7.3]

## 4 Symbols, subscripts and abbreviations

## 4.1 Symbols

[SOURCE: EN ISO 52000-1:2017]

For the purposes of this document, the symbols listed in Table 2 apply.

The following text includes symbols that are not used in this document, but that are needed for overall consistency in the set of EPB standards.

**Table 2 — Symbols and units**

Symbol	Quantity	Unit
$c$	coefficient	various <sup>a</sup>
$E$	energy in general <sup>b</sup>	kW·h
$f$	factor (e.g. primary energy factor, ...)	– <sup>a</sup>
$H$	calorific value, net or gross (NCV or GCV),	kW·h/kg
$K$	CO <sub>2</sub> emission coefficient	kg/(kW·h)
$Q$	quantity of heat	kW·h
$\eta$	efficiency (factor)	– <sup>a</sup>
$\varepsilon$	expenditure factor	– <sup>a</sup>

<sup>a</sup> Coefficients have dimensions; factors are dimensionless.  
<sup>b</sup> Including primary energy; note that for heat the symbol  $Q$  and for auxiliary energy and work the symbol  $W$  is used.

## 4.2 Subscripts

[SOURCE: EN ISO 52000-1:2017]

For the purposes of this document, the subscripts listed in Table 3 apply.

The following text includes subscripts that are not used in this document, but that are needed for overall consistency in the set of EPB standards.

**Table 3 — Subscripts**

Subscript	Term	Subscript	Term
CO <sub>2</sub>	CO <sub>2</sub> emission	nren	non-renewable
cr	energy carrier	ntdel	net delivered
del	delivered	P	primary energy
dis	distribution	Pnren	non-renewable primary energy
el	electricity	pr	produced
exp	exported	pv	solar electricity (photovoltaic)
gen	generation	ren	renewable energy
<i>i, j, k</i>	indexes	tot	total
in	input	we	weighting
ls	losses		

## 4.3 Abbreviations

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For the purposes of this document, the abbreviations listed in Table 4 apply.

**Table 4 — Abbreviations**

Abbreviation	Term
CHP	Combined Heat and Power
EPB	Energy Performance of Buildings
GHG	Green House Gases
GWP	Global Warming Potential
LCA	Live Cycle Analysis
PEF	Primary Energy Factor
PV	Photovoltaic