TECHNICAL REPORT

ISO/TR 52003-2

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Energy performance of buildings — Indicators, requirements, ratings and certificates —

Part 2: Explanation and justification of ISO 52003-1

Performance énergétique des bâtiments — Indicateurs, exigences, classification et certificats —

Partie 2: Explication et justification de l'ISO 52003-1

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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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: 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, in collaboration with ISO/TC 205, *Building environment design*, and 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).

A list of all parts in the ISO 52003 series can be found on the ISO website.

Introduction

Relation between this document and the accompanying International Standard

For proper understanding of the present document, it is necessary to read it in close conjunction, clause by clause, with ISO 52003-1. First, the corresponding clause in Part 1 needs to be read; then the complementary information in the same clause in this report can be read. Essential information provided in Part 1 is not repeated in this part. References to a clause refer to the combined content of that clause in both parts 1 and 2. Brief articles on the subject can be found in [14] and [15].

The set of EPB standards, technical reports and supporting tools

In order to facilitate the necessary overall consistency and coherence, in terminology, approach, input/output relations and formats, for the whole set of EPB-standards, the following documents and tools are available:

a) a document with basic principles to be followed in drafting EPB-standards: CEN/TS 16628:2014, Energy Performance of Buildings - Basic Principles for the set of EPB standards[6];

b) a document with detailed technical rules to be followed in drafting EPB-standards: CEN/TS 16629:2014, Energy Performance of Buildings - Detailed Technical Rules for the set of EPB-standards[7];

The detailed technical rules are the basis for the following tools:

1) a common template for each EPB standard, including specific drafting instructions for the relevant clauses;

2) a common template for each technical report that accompanies an EPB standard or a cluster of EPB standards, including specific drafting instructions for the relevant clauses;

3) a common template for the spreadsheet that accompanies each EPB (calculation) standard, to demonstrate the correctness of the EPB calculation procedures.

Each EPB standard follows the basic principles and the detailed technical rules and relates to the overarching EPB standard, ISO 52000-1[10].

One of the main purposes of the revision of the EPB standards has been to enable that laws and regulations directly refer to the EPB standards and make compliance with them compulsory. This requires that the set of EPB standards consists of a systematic, clear, comprehensive and unambiguous set of energy performance procedures. The number of options provided is kept as low as possible, taking into account national and regional differences in climate, culture and building tradition, policy and legal frameworks (subsidiarity principle). For each option, an informative default option is provided (Annex B).

Rationale behind the EPB Technical Reports

There is a risk that the purpose and limitations of the EPB standards will be misunderstood, unless the background and context to their contents – and the thinking behind them – is explained in some detail to readers of the standards. Consequently, various types of informative contents are recorded and made available for users to properly understand, apply and nationally or regionally implement the EPB standards.

If this explanation would have been attempted in the standards themselves, the result is likely to be confusing and cumbersome, especially if the standards are implemented or referenced in national or regional building codes.

Therefore each EPB standard is accompanied by an informative technical report, like this one, where all informative content is collected, to ensure a clear separation between normative and informative contents (see CEN/TS 16629[7]):

— to avoid flooding and confusing the actual normative part with informative content;

— to reduce the page count of the actual standard; and

— to facilitate understanding of the set of EPB standards.

This was also one of the main recommendations from the European CENSE project[12] that laid the foundation for the preparation of the set of EPB standards.

This document

This document accompanies ISO 52003-1, which forms part of the set of EPB standards.

The role and the positioning of the accompanying standard in the set of EPB standards is defined in the Introduction to ISO 52003-1.

Accompanying spreadsheet(s)

Because in the accompanying document ISO 52003-1 no calculation procedures are defined, an accompanying calculation spreadsheet is not relevant.

History of this document and the accompanying International Standard

The first standard on this topic was EN 15217:2007[2]. It was developed as part of Mandate 343 of the EC to CEN to support the EPBD (2003)[3]. An upgrade of it was published as ISO 16343:2013[4]. The document has been thoroughly reworked and split in a normative International Standard (Part 1) and the present informative document (Part 2) as part of Mandate 480 of the EC to CEN[5].

Energy performance of buildings — Indicators, requirements, ratings and certificates —

Part 2: Explanation and justification of ISO 52003-1

1 Scope

This document refers to ISO 52003-1. It contains information to support the correct understanding and use of ISO 52003-1 and does not contain any normative provisions.

NOTE The relation with other EPB standards, product standards and product policy is shown schematically in Figure 4 of Clause 6.

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.

More information on the use of EPB module numbers for normative references between EPB standards is given in ISO/TR 52000-2[11].

ISO 52003-1:2017, *Energy performance of buildings – Indicators, requirements, ratings and certificates – Part 1: General aspects and application to the overall energy performance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the accompanying EPB document, ISO 52003-1, 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 http://www.iso.org/obp

More information on some key EPB terms and definitions is given in ISO/TR 52000-2[11].

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this document, the symbols given in ISO 52003-1 and the following apply.

More information on key EPB symbols is given in ISO/TR 52000-2[11].

Symbol	Name of quantity	Unit
A	area	m^2
c	constant	a)
f	factor	-
f	shape factor	-
V	volume	m^3
a) varies with the context		

4.2 Subscripts

For the purposes of this document, the subscripts given in ISO 52003-1 and the following apply.

More information on key EPB subscripts is given in ISO/TR 52000-2.

c	conditioned
env	envelope
use	useful

5 Description of the document

5.1 General

Figure 1 shows in a first, simplified step and in a schematic manner, the main uses that can be made of the EPB indicators.

EPB indicators are numeric quantities that are the intermediate or final output of the EPB assessment standards (see also Figure 4 in Clause 6). They can be the result of either calculations (e.g. a thermal transmittance value) or of measurements (e.g. the air tightness value of the thermal envelope) or a combination of both (e.g. an overall energy performance value that is partly based on a measured air tightness). Ideally, all mathematical operations of a technical variable are defined in the EPB assessment standards and the value as such (and its definition) are directly ready for further use, without the need for further mathematical manipulation.

The EPB indicators can be used in several different ways by public and private actors. A first major use of EPB indicators is to impose regulatory EPB requirements on construction works of all kinds. A second major use is to rate the energetic quality of the considered EPB feature through comparison with benchmarks. The EPB requirements can serve as one of the references for the rating. There can still be other uses, such as the use of a variable as target function for design optimization, e.g. the least life cycle cost.

Selected EPB indicators, ratings, requirements and their (non)compliance (if applicable), and other information (such as recommendations for improvement of the energy performance) can be included in the EPB certificate, and its detailed report.

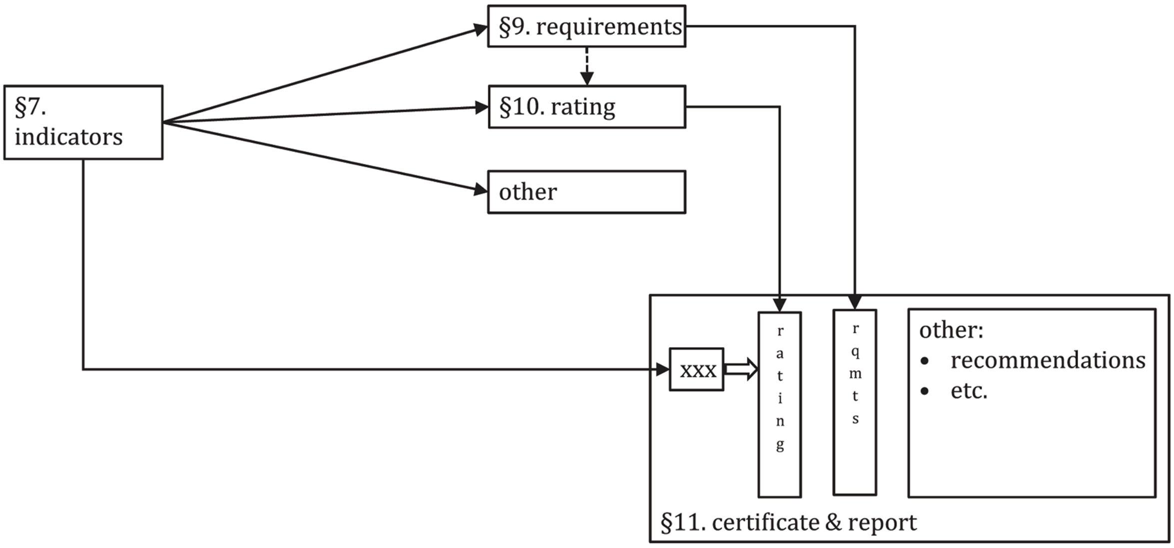

Figure 1 — Simplified schematic overview of the relations between various EPB aspects

Figure 2 illustrates in dotted lines potential additional interactions. In order to achieve equitable requirements or ratings, it can be necessary for many indicators to use in a first instance variable values as requirement or reference. Such variable values are tailored to the characteristics of each individual project. For ease of communication, the primary indicator can be converted in a second instance into a derived indicator by taking its ratio to the variable requirement or reference value. The derived, secondary indicator then again allows the requirement or rating reference to be a constant value, which can greatly facilitate communication. Generally speaking, it seems desirable that all mathematical operations are defined in the actual EPB assessment standards. But for derived indicators that are intrinsically related to the (requirement and rating) policy choices, the last few mathematical calculations inevitably can only be defined in a regulatory context.

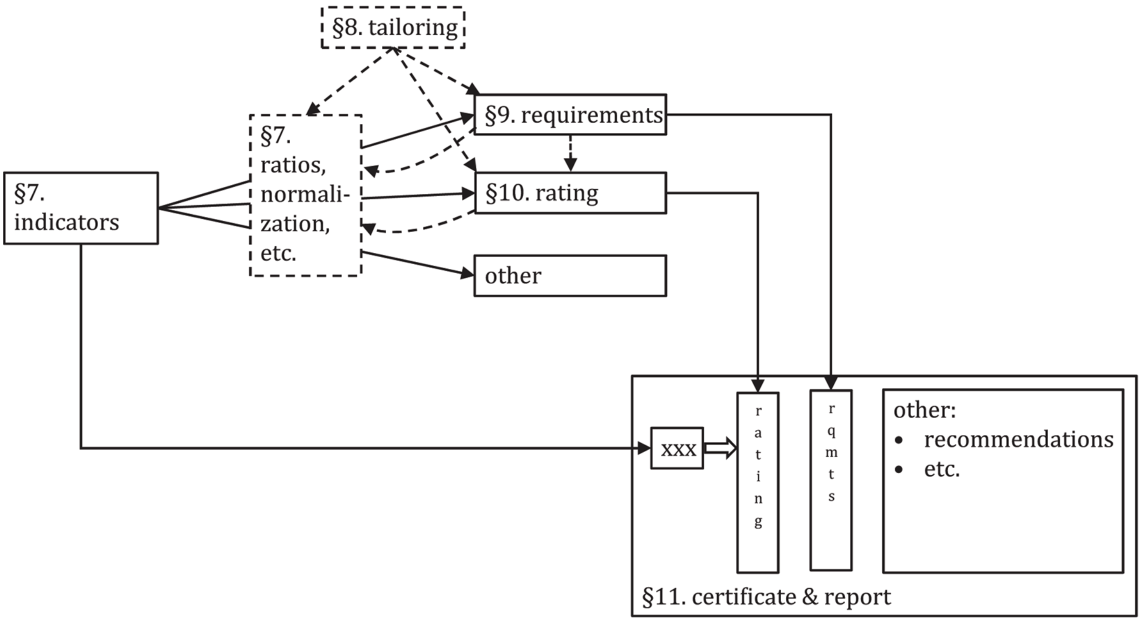

Figure 2 — Full schematic overview of the relations between various EPB aspects

5.2 Selection criteria between possible options

No additional information beyond the accompanying document.

5.3 Input and output data

No additional information beyond the accompanying document.

6 Relation between EPB features, indicators, requirements, ratings and certificates

The conceptual table of Figure 3 is an alternative to the presentation in Figure 2. It allows a user to visualize and report the practical choices that a given (public or private) actor makes with respect to its uses of the EPB indicators.

On top of each of the columns of the table, the number of the clause in ISO 52003-1 and ISO/TR 52003-2 that deals with the particular aspect is given.

In the first column, the different EPB features can be listed. (For reasons of sizing, here these are done in an exemplary, non-exhaustive manner.) They can be grouped in 3 categories: overall energy performances, partial energy performances and the energy performances of products ("traded commodities").

NOTE 1 The product group can of course include devices that are not used in buildings (e.g. vehicles) or that are not always considered in the building energy performance assessment (for instance, the energy use of plug-in appliances such as refrigerators, televisions, computers etc., is usually not included in the calculations of the energy use of the building, but is usually part of the measured overall building energy performance).

In the second column, the possible indicators for each of the EPB features can be listed.

Clause 7	Clause 7	Clause 9		Clause 10	-
EPB feature	**indicator**	**requirements**		**rating**	**other uses**
		new	**existing**		
OVERALL ENERGY PERFORMANCES					
primary energy use		X			
non-renewable primary energy use				X	
…					
PARTIAL ENERGY PERFORMANCES					
…	…				
lighting	LENI				
	…				
fans					
	specific fan power				
	…				
systems					
	efficiency		X		
	expenditure factor				
…	…				
heating need					
	…				

Clause 7	Clause 7	Clause 9		Clause 10	-
EPB feature	**indicator**	**requirements**		**rating**	**other uses**
		new	**existing**		
cooling need					
	...				
envelope airtight-ness					
	specific air leakage				
	...				
overall thermal insulation	mean thermal transmittance				
component ther-mal insulation					
	thermal transmittance		X		
	temperature factor				
...					
PRODUCT ENERGY PERFORMANCES					
...					
boilers					
pumps					
fans					
...					
refrigerators				X	
televisions					
...					
vehicles					
...					

Figure 3 — Tabular overview of the relation between various EPB aspects

The third column concerns requirements. It is subdivided into 2 sub-columns, dealing with new construction on the one hand and works in existing buildings on the other hand. With a cross, the EPB indicators for which requirements are set can be indicated. These can differ between new construction (focus typically on one or more overall EPB indicators) and works in existing buildings (by their nature, focus typically on the elements and systems that are the object of the works).

In the fourth column crosses can indicate the indicators that are rated.

The empty fifth column reminds that there can be many more uses for the EPB indicators. The column can be replaced by several columns if the purpose is to illustrate/document practical instances where such other uses apply.

In Figure 4, the further relation with the assessment methods is shown. The arrows in the figure represent the transfer of data (output of 1 module is input for 1 or more other modules) towards the final use of a result (e.g. as indicator).

Product standards assess basic characteristics either by measurement or calculation, or a combination of both. Sometimes there is for a given product an alternative, free choice between measurement and calculation methods (e.g. the thermal transmittance of glazing). This choice is represented by the ellipse in Figure 4. Product calculation methods usually rely on measured features of its composing elements (e.g. coating with low thermal emissivity in glazing, or dimensions of a frame) or on production control