PD CEN ISO/TR 52003-2:2017

BSI Standards Publication

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

Part 2: Explanation and justification of ISO 52003-1 (ISO/TR 52003-2:2017)

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National foreword

This Published Document is the UK implementation of CEN ISO/TR 52003-2:2017. It is identical to ISO/TR 52003-2:2017. Together with BS EN ISO 52003-1:2017, it supersedes BS EN 15217:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/540/8, Mirror committee for ISO/TC 163 - Thermal Performance and Energy use in the built Environment.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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European foreword

This document (CEN ISO/TR 52003-2:2017) 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of an identical text or by endorsement, at the latest by January 2018 and conflicting national standards shall be withdrawn at the latest by January 2018.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, [EF2]), to support the first edition of the EPBD [EF1] resulted in the successful publication of all EPBD related CEN standards in 2007-2008.

The mandate M/480 was issued to review the mandate 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,

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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 & 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 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.

Together, EN ISO 52003-1 and EN ISO/TR 52003-2 supersede EN 15217:2007 [EF5], which was developed during the first EPBD mandate (M/343).

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] 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) of 14th December 2010

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

[EF5] EN 15217:2007, Energy performance of buildings – Methods for expressing energy performance and for energy certification of buildings

Endorsement notice

The text of ISO/TR 52003-2:2017 has been approved by CEN as CEN ISO/TR 52003-2:2017 without any modification.

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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.

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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.

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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].

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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.

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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.

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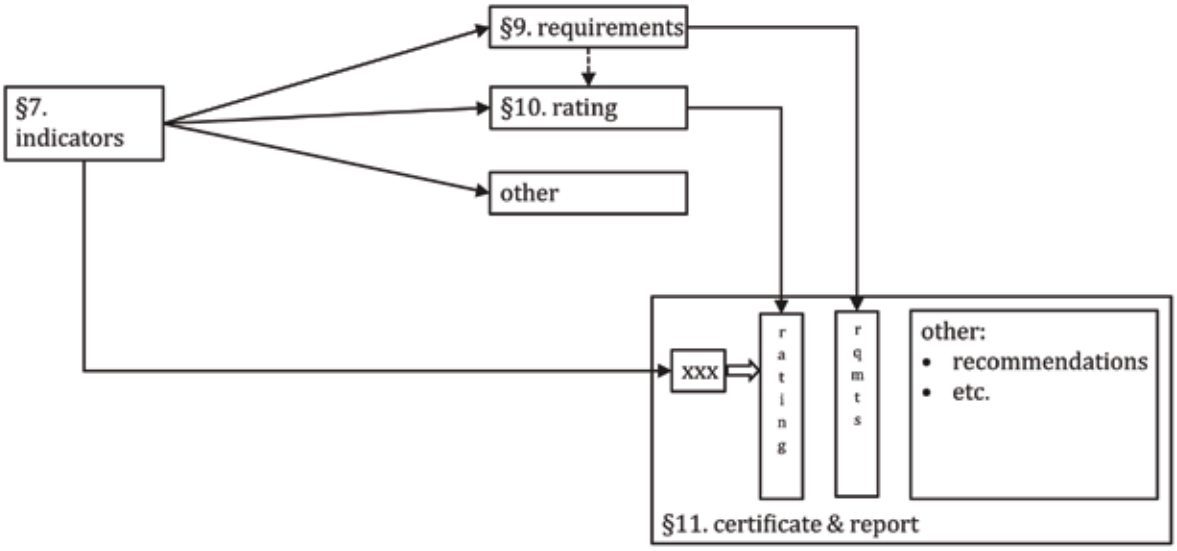

Figure 1 — Simplified schematic overview of the relations between various EPB aspects

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.

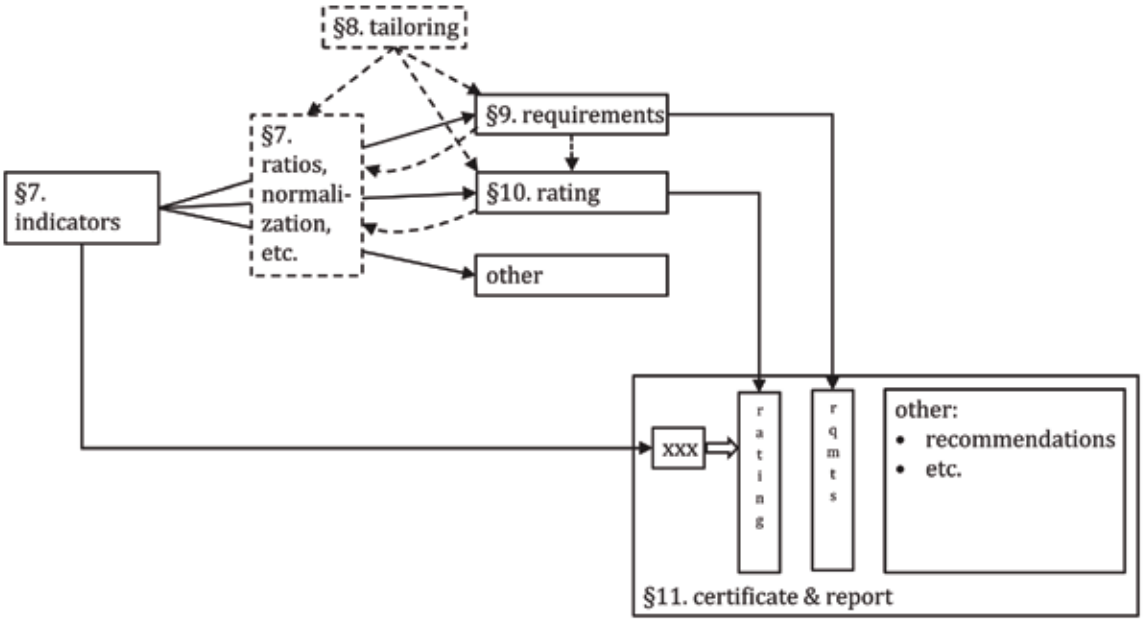

Figure 2 — Full schematic overview of the relations between various EPB aspects

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