PD CEN/TR 16798-14:2017

BSI Standards Publication

# Energy performance of buildings - Ventilation for buildings

Part 14: Interpretation of the requirements in EN 16798-13 - Calculation of cooling systems (Module M4-8) - Generation



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# National foreword

This Published Document is the UK implementation of CEN/TR 16798-14:2017. Together with BS EN 16798-9:2017 and BS EN 16798-13:2017, it supersedes BS EN 15243:2007, which is withdrawn.

BSI, as a member of CEN, is obliged to publish CEN/TR 16798-14:2017 as a Published Document. However, attention is drawn to the fact that during the development of this Published Document, the UK committee voted against its approval.

The technical reasoning behind the UK committee's response relates to the fact that it voted against the approval of EN 16798-13:2017 as a European Standard, to which this Technical Report relates.

Users may wish to consider these issues when specifying products.

The UK participation in its preparation was entrusted to Technical Committee RHE/2, Ventilation for buildings, heating and hot water services.

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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**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2018.

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TECHNICAL REPORT

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# CEN/TR 16798-14

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English Version

# Energy performance of buildings - Ventilation for buildings - Part 14: Interpretation of the requirements in EN 16798-13 - Calculation of cooling systems (Module M4-8) - Generation

Energieeffizienz von Gebäuden - Lüftung von Gebäuden - Teil 14: Interpretation der Anforderungen der EN 16798-13 - Berechnung von Kühlsystemen (Modul M4-8) - Erzeugung

This Technical Report was approved by CEN on 27 February 2017. It has been drawn up by the Technical Committee CEN/TC 156.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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## European foreword

This document (CEN/TR 16798-14:2017) has been prepared by Technical Committee CEN/TC 156 "Ventilation for buildings", the secretariat of which is held by BSI.

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

This document supersedes EN 15243:2007.

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

The necessary editorial revisions were made to comply with the requirements for each EPB Technical Report.

This document has been produced to meet the requirements of Directive 2010/31/EU 19 May 2010 on the energy performance of buildings (recast), referred to as "recast EPDB".

For the convenience of Standards users CEN/TC 156, together with responsible Working Group Convenors, have prepared a simple table below relating, where appropriate, the relationship between the 'EPBD' and 'recast EPBD' standard numbers prepared by Technical Committee CEN/TC 156 "Ventilation for buildings".

| EPBD EN Number | Recast EPBD EN Number | Title |
|---|---|---|
| EN 15251 | EN 16798-1 | Energy performance of buildings – Ventilation for buildings – Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics (Module M1-6) |
| N/A | CEN/TR 16798-2 | Energy performance of buildings – Ventilation for buildings – Part 2: Interpretation of the requirements in EN 16798-1 – Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics (Module M1-6) |
| EN 13779 | EN 16798-3 | Energy performance of buildings – Ventilation for buildings – Part 3: For non-residential buildings – Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4) |
| N/A | CEN/TR 16798-4 | Energy performance of buildings – Ventilation for buildings – Part 4: Interpretation of the requirements in EN 16798- 3 – For non-residential buildings – Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4) |

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|---|---|---|
| EN 15241 | EN 16798-5-1 | Energy performance of buildings – Ventilation for buildings – Part 5-1: Calculation methods for energy requirements of ventilation and air conditioning systems (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) – Method 1: Distribution and generation |
| EN 15241 | EN 16798-5-2 | Energy performance of buildings – Ventilation for buildings – Part 5-2: Calculation methods for energy requirements of ventilation systems (Modules M5-6.2, M5-8.2) – Method 2: Distribution and generation |
| N/A | CEN/TR 16798-6 | Energy performance of buildings – Ventilation for buildings – Part 6: Interpretation of the requirements in EN 16798-5–1 and EN 16798-5-2 – Calculation methods for energy requirements of ventilation and air conditioning systems (Modules M5-6, M5-8, M 6-5, M6-8, M7-5, M7-8) |
| EN 15242 | EN 16798-7 | Energy performance of buildings – Ventilation for buildings – Part 7: Calculation methods for the determination of air flow rates in buildings including infiltration (Module M5-5) |
| N/A | CEN/TR 16798-8 | Energy performance of buildings – Ventilation for buildings – Part 8: Interpretation of the requirements in EN 16798-7 – Calculation methods for the determination of air flow rates in buildings including infiltration – (Module M5-5) |
| EN 15243 | EN 16798-9 | Energy performance of buildings – Ventilation for buildings – Part 9: Calculation methods for energy requirements of cooling systems (Modules M4-1, M4-4, M4-9) – General |
| N/A | CEN/TR 16798-10 | Energy performance of buildings – Ventilation for buildings – Part 10: Interpretation of the requirements in EN 16798-9 – Calculation methods for energy requirements of cooling systems (Module M4-1,M4-4, M4-9) – General |
| EN 15243 | EN 16798-13 | Energy performance of buildings – Ventilation for buildings – Part 13: Calculation of cooling systems (Module M4-8) – Generation |
| EN 15243 | CEN/TR 16798-14 | Energy performance of buildings – Ventilation for buildings – Part 14: Interpretation of the requirements in EN 16798-13 – Calculation of cooling systems (Module M4-8) – Generation |
| N/A | EN 16798-15 | Energy performance of buildings – Ventilation for buildings – Part 15: Calculation of cooling systems (Module M4-7) – Storage |

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|---|---|---|
| N/A | CEN/TR 16798-16 | Energy performance of buildings – Ventilation for buildings – Part 16: Interpretation of the requirements in EN 16798-15 – Calculation of cooling systems (Module M4-7) – Storage |
| EN 15239 and EN 15240 | EN 16798-17 | Energy performance of buildings – Ventilation for buildings – Part 17: Guidelines for inspection of ventilation and air-conditioning systems (Module M4-11, M5-11, M6-11, M7-11) |
| N/A | CEN/TR 16798-18 | Energy performance of buildings – Ventilation for buildings – Part 18: Interpretation of the requirements in EN 16798-17 – Guidelines for inspection of ventilation and air-conditioning systems (Module M4-11, M5-11, M6-11, M7-11) |

# Introduction

**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, *Energy Performance of Buildings — Basic Principles for the set of EPB standards* [1];

b) a document with detailed technical rules to be followed in drafting EPB-standards; CEN/TS 16629, *Energy Performance of Buildings — Detailed Technical Rules for the set of EPB-standards* [2], and

c) 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, and

   3) a common template for the spreadsheet that accompanies each EPB 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, EN ISO 52000-1 [3].

One of the main purposes of the revision of the EPB-standards is 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 [2]):

— 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 [5] that laid the foundation for the preparation of the set of EPB standards.

**This Technical Report**

This Technical Report accompanies the suite of EPB standards on ventilation for buildings. It relates to the European standard EN 16798-13, which forms part of a set of standards related to the evaluation of the energy performance of buildings (EPB).

The role and the positioning of the accompanied standard in the set of EPB standards is defined in the Introduction to the standard.

**Accompanying spreadsheets**

Concerning the accompanied standard EN 16798-13, the following spreadsheets were produced:

— EN 16798-13, Method A;

— EN 16798-13, Method B, example 1; and

— EN 16798-13, Method B, example 2.

In this Technical Report, examples of each of these calculation sheets are included.

# 1 Scope

This Technical Report refers to the standard EN 16798-13.

It contains information to support the correct understanding and use of this standard.

# 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 14511 (all parts), *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling*

EN 14825, *Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance*

EN 16798-13, *Energy performance of buildings — Part 13: Module M4-8 — Calculation of cooling systems — Generation*

# 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16798-13 apply.

NOTE More information on some key EPB terms and definitions is given in CEN ISO/TR 52000-2.

# 4 Symbols, subscripts and abbreviations

For the purposes of this document, the symbols, subscripts and abbreviations as mentioned and given in the accompanied EPB standard, EN 16798-13, apply.

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

# 5 Brief description of the methods and routing

## 5.1 Output of the method

No additional information beyond the accompanied standard.

## 5.2 General description of the methods

### 5.2.1 Method A

The method is designed for an hourly calculation, based on the operational conditions and system design possibilities. It covers the cooling generator calculation including multiple generators, the heat rejection devices and its control, and includes the possibility of “free cooling” in form of bypassing the generator and using the heat rejection device directly when the climate conditions allow for. Also, heat to be rejected is offered as a potential heat to be recovered on the heating/domestic hot water side.