Energy performance of buildings - Ventilation for buildings - Part 5-2: Calculation methods for energy requirements of ventilation systems (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) - Method 2: Distribution and generation

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16798-5-2:2017 sisaldab Euroopa standardi EN 16798-5-2:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 16798-5-2:2017 consists of the English text of the European standard EN 16798-5-2:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.08.2017.	Date of Availability of the European standard is 16.08.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.120.10, 91.140.30

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English Version

Energy performance of buildings - Ventilation for buildings - Part 5-2: Calculation methods for energy requirements of ventilation systems (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) - Method 2: Distribution and generation

Performance énergétique des bâtiments - Ventilation des bâtiments - Partie 5-2 : Méthodes de calcul pour les besoins énergétiques des systèmes de ventilation (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) - Méthode 2 : Distribution et génération

Energieeffizienz von Gebäuden - Modul M5-6.2, M5-8.2 - Lüftung von Gebäuden - Berechnungsverfahren für den Energiebedarf von Lüftungssystemen - Teil 5-2: Verteilung und Erzeugung (Revision von EN 15241) - Methode 2

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.

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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 16798-5-2:2017) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

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 February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 15241:2007.

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

Regarding the modifications that were made with regard to EN 15241:2007, these are listed in the last paragraph in the Introduction.

This standard 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”.

EN 15241:2007 was produced to meet the requirements of Directive 2002/91/EC 16 December 2002 on energy performance of buildings referred to as “EPBD”.

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	FprEN 16798–1[1)]	Energy performance of 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 (revision of EN 15251)
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)

1) At voting stage by the time the present text is published.

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) (revision of EN 13779)
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)
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 (revision of EN 15241)
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, M5-8, M6-5, M6-8, M7-5, M7-8) — Method 2: Distribution and generation (revision of EN 15241)
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, M6-5, 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 (Modules M5-5) (revision of EN 15242)
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 (revision of EN 15243)
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 (revision of EN 15243)

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 (revision of EN 15243)
N/A	EN 16798–15	Energy performance of buildings — Ventilation for buildings — Part 15: Calculation of cooling systems (Module M4-7) — Storage
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 (Modules M4-11, M5-11, M6-11, M7-11)

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.

Introduction

This European Standard is part of a series of standards aiming at international harmonization of the methodology for the assessment of the energy performance of buildings, called “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 standard, a normative template is given in Annex A to specify these choices. Informative default choices are provided in Annex B.

The main target groups of this standard are all the users of the set of EPB standards (e.g. engineers, regulators, programmers).

Use by or for regulators: In case the 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. 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 standard to assess the energy performance of a building, and thereby **use** the choices made by the regulators.

Topics addressed in this standard can be subject to public regulation. Public regulation on the same topics can override the default values in Annex B of this standard. Public regulation on the same topics can even, for certain applications, override the use of this standard. 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, the National Annex (e.g. NA) refers to this text;

— 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.

Default references to EPB standards other than EN ISO 52000-1 are identified by the EPB module code number and given in Table B.1. If alternative references are specified, this should be done in Table NA.1 of a National Annex, which should follow the template given in Table A.1.

NOTE 2 Example of EPB module code number: M5–5, or M5–5.1 (if module M5–5 is subdivided), or M5–5/1 (if reference to a specific clause of the standard covering M5–5.

NOTE 3 The same module code numbering is bound to be used in other EPB standards. This will facilitate, in an individual country, the making of a consistent set of national annexes for each EPB standard and contribute to the overall consistency and transparency.

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 accompanying this standard (CEN/TR 16798-6), including examples aiming to check the quality and usability of the standard.

CEN/TC 156 deals with ventilation and air conditioning systems in buildings. Subjects covered by CEN/TC 156 are:

1) energy performance calculation for ventilation, air conditioning and cooling systems;

2) inspection of ventilation and air conditioning systems; and

3) installation and commissioning of ventilation and air conditioning systems.

The revision includes changes:

— for a rearrangement of content versus EN 15242:2007, in order to better fit in the modular structure given in EN ISO 52000-1:2017;

— to cover ventilation systems which is intended for residential buildings (including air heating and air cooling definition, see the module M5-1 standard);

— for an improved fan energy calculation, taking into consideration control strategies according to CEN/TC 247 and fan product standards /data;

— for an improved calculation of heat recovery devices, delivering the efficiency and auxiliary energy depending on control;

— for the consideration of recirculation;

— the formatting according to the new rules set in CEN/TS 16629;

— the consideration of ISO/TC 205 work performed in the meantime.

1 Scope

This European Standard covers energy performance calculation of mechanical ventilation systems with integrated heating/cooling generation, including domestic hot water production, using a monthly or seasonal calculation interval or a bin method. It takes into account the generation (air handling unit) and distribution (duct system) parts. It does not cover the emission part (calculation of the required volume flow rates and/or supply air conditions), which is covered in the M5-5 standard. It does not include humidification and dehumidification. This method is focussed on small, packaged ventilation systems, typically used in residential buildings, although the application is not restricted on the basis of building or space use type.

A calculation method for mechanical ventilation and air conditioning systems, including humidification and dehumidification, using an hourly calculation interval or a bin method, is provided in a separate standard, EN 16798-5-1.

Table 1 shows the relative position of this standard within the set of EPB standards in the context of the modular structure as set out in EN ISO 52000-1.

NOTE 1 In CEN 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 2 The modules represent EPB standards, although one EPB standard might cover more than one module and one module might be covered by more than one EPB standard, for instance a simplified and a detailed method respectively. See also Clause 2 and Tables A.1 and B.1.

Table 1 — Position of this standard (in casu M5–6, M5–8) within the EPB set of standards

		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								[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		Emission and control									
6		Building Occupancy and Operating Conditions		Heat Transfer by Infiltration and Ventilation		Distribution and control			EN 16798–5-2						
7		Aggregation of Energy Services and Energy Carriers		Internal Heat Gains		Storage 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**
8		Building zoning		Solar Heat Gains		Generation and control			EN 16798–5-2						
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													

[a] The shaded modules are not applicable.

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.

EN 1507, *Ventilation for buildings — Sheet metal air ducts with rectangular section — Requirements for strength and leakage*

EN 12237, *Ventilation for buildings — Ductwork — Strength and leakage of circular sheet metal ducts*

EN 12792:2003, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 12975-1, *Thermal solar systems and components — Solar collectors — Part 1: General requirements*

EN 13141-7, *Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings*

EN 13141-8, *Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room*

EN 13142, *Ventilation for buildings — Components/products for residential ventilation — Required and optional performance characteristics*

EN 14239, *Ventilation for buildings — Ductwork — Measurement of ductwork surface area*

EN 16147, *Heat pumps with electrically driven compressors — Testing, performance rating and requirements for marking of domestic hot water units*

EN 16573, *Ventilation for Buildings — Performance testing of components for residential buildings — Multifunctional balanced ventilation units for single family dwellings, including heat pumps*

EN 16798-3:2017, *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)*

EN 16798–5–1:2017, *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*

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, M6-5, M6-8 , M7-5, M7-8)*

EN ISO 7345:1995, *Thermal insulation — Physical quantities and definitions (ISO 7345:1987)*

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