



BSI Standards Publication

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)

National foreword

This British Standard is the UK implementation of EN 16798-3:2025. It supersedes BS EN 16798-3:2017, which is withdrawn.

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 committee manager.

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Gebäuden - Teil 3: Lüftung von Nichtwohngebäuden -
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Klimaanlagen und Raumkühlssysteme (Module M5-1,
M5-4)

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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.

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European foreword

This document (EN 16798-3:2025) 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of an identical text or by endorsement, at the latest by October 2025, and conflicting national standards shall be withdrawn at the latest by October 2025.

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 supersedes EN 16798-3:2017.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

This document includes the following significant technical changes with respect to EN 16798-3:2017:

- new structure to clarify designing and calculation aspects;
- update of filtration aspects;
- update of heat recovery aspects and leakages in these systems;
- update of aspects of energy performance;
- update of definitions of systems;
- update of SFP definitions and links to Regulation (EU) No 327/2011;
- addition of an informative Annex C for additional design aspects, which has been shifted from CEN/TR 16798-4;
- the document allows a normative national annex.

EN 16798-3:2017 was produced to meet the requirements of Directive 2002/91/EC 16 December 2002 on energy performance of buildings referred to as “EPBD”.

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 EPBD”.

For the convenience of Standards users CEN/TC 156, together with responsible Working Group Conveners, have prepared a simple Table below relating, where appropriate, the ‘EPBD’ standard numbers prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North

Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Recast EPBD EN Number	Title
EN 16798-1	<i>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)</i>
CEN/TR 16798-2	<i>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)</i>
EN 16798-3	<i>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)</i>
CEN/TR 16798-4	<i>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)</i>
EN 16798-5-1	<i>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</i>
EN 16798-5-2	<i>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</i>
CEN/TR 16798-6	<i>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)</i>
EN 16798-7	<i>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)</i>
CEN/TR 16798-8	<i>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)</i>
EN 16798-9	<i>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</i>
CEN/TR 16798-10	<i>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</i>

Recast EPBD EN Number	Title
EN 16798-13	<i>Energy performance of buildings — Ventilation for buildings — Part 13: Calculation of cooling systems (Module M4-8) — Generation</i>
CEN/TR 16798-14	<i>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</i>
EN 16798-15	<i>Energy performance of buildings — Ventilation for buildings — Part 15: Calculation of cooling systems (Module M4-7) — Storage</i>
CEN/TR 16798-16	<i>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</i>
EN 16798-17	<i>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)</i>
CEN/TR 16798-18	<i>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)</i>

Introduction

This document is part of a series of standards aiming at European harmonization of the methodology for the assessment of the energy performance of buildings, called “set of EPB standards”.

The set of EPB standards follow specific rules to ensure overall consistency, unambiguity and transparency.

The set of 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 template for national default choices in Annex A and with informative default choices in Annex B.

For the correct use of this document, 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 document are all the users of the set of EPB standards (e.g. architects, engineers, regulators).

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 or 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 So in this case:

- the regulators specify the choices;
- the individual user applies the document to assess the energy performance of a building, and thereby use the choices made by the regulators.

Topics addressed in this document can be subject to public regulation. Public regulation on the same topics can override the default values in Annex B of this document. Public regulation on the same topics can even, for certain applications, override the use of this document. 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 with the legal documents that give national or regional values and choices.

Further target groups are parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

This document also provides specifications especially for designers, installers, manufacturers, building owners and users, on fan assisted ventilation (see Figure 1), air-conditioning and room-conditioning systems in order to achieve a comfortable and healthy indoor environment in all seasons with acceptable installation and running costs. This document focuses on the system-aspects for typical applications and covers the following:

- aspects important to achieve and maintain a good energy performance in the systems without any negative impact on the quality of the indoor environment;
- definitions of design and performances data.

More information is provided in the Technical Report accompanying this document (CEN/TR 16798-4).

For the designing use of this document, an informative default Annex providing additional design parameters is given with Annex C. CEN Members are free to use Annex C or supplement this document with their national design parameters in a national foreword.

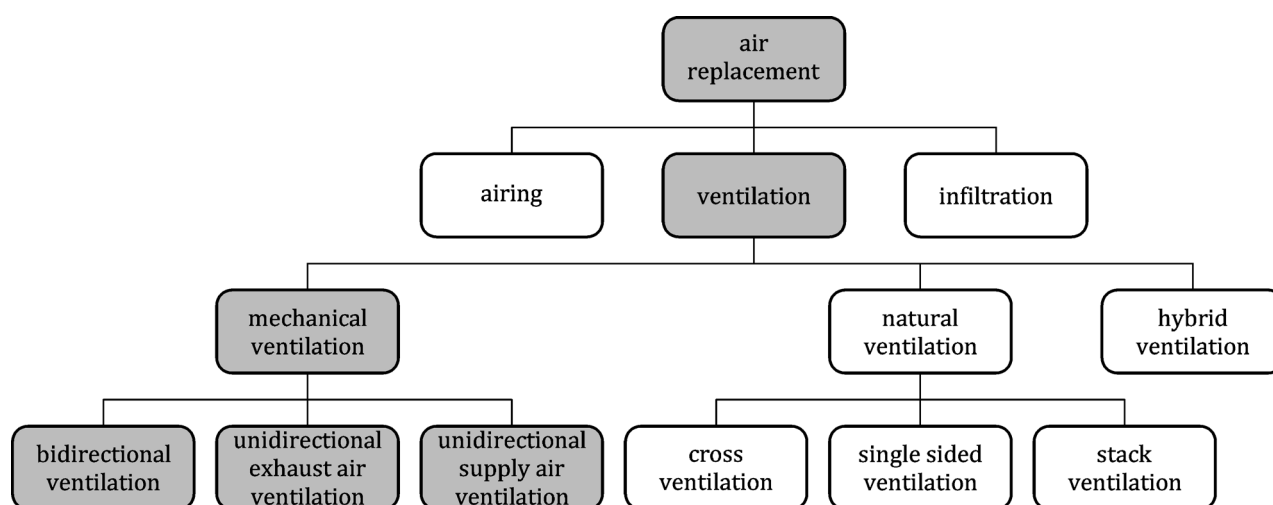


Figure 1 — Generic concept relation of air replacement

1 Scope

This document applies to the design, energy performance of buildings and implementation of ventilation, air conditioning and room conditioning systems for non-residential buildings subject to human occupancy, excluding applications like industrial processes. It focuses on the definitions of the various parameters that are relevant for such systems.

The guidance for design given in this document and accompanying CEN/TR 16798-4 are mainly applicable to mechanical supply and/or exhaust ventilation systems. Natural ventilation systems or natural parts of hybrid ventilation systems are not covered by this document.

Applications for residential ventilation are not covered in this document. Performance of ventilation systems in residential buildings is covered in EN 15665 and CEN/TR 14788.

The classification uses different categories. For some values, examples are given and, for requirements, typical ranges with default values are presented. The default values are given in Annex B and a template for national specification is given in Annex A. It is important that the classification is always appropriate to the type of building and its intended use, and that the basis of the classification is explained if the examples given in this document are not used.

NOTE 1 Different standards can express the categories for the same parameters in a different way, and also the category symbols can be different.

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

NOTE 2 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 3 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 Table A.1 and Table B.1.

Table 1 — Position of this standard (in case M5-1, M5-4), within the modular structure of the set of EPB standards

Overarching		Building (as such)		Technical Building Systems										
	Descriptions		Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic hot water	Lighting	Building automation and control	PV, wind, ...
sub1	M1	sub1	M2	sub1	M3	M4	M5	M6	M7	M8	M9	M10	M11	
1	General	1	General	1	General			EN 16798-3						
2	Common terms and definitions; symbols, units and subscripts	2	Building Energy Needs	2	Needs									
3	Applications	3	(Free) Indoor Conditions without Systems	3	Maximum Load and Power									
4	Ways to Express Energy Performance	4	Ways to Express Energy Performance	4	Ways to Express Energy Performance			EN 16798-3						
5	Building Functions and Building Boundaries	5	Heat Transfer by Transmission	5	Emission and control									
6	Building Occupancy and Operating Conditions	6	Heat Transfer by Infiltration and Ventilation	6	Distribution and control									

7	Aggregation of Energy Services and Energy Carriers	7	Internal Heat Gains	7	Storage and control												
8	Building Partitioning	8	Solar Heat Gains	8	Generation and control												
9	Calculated Energy Performance	9	Building Dynamics (thermal mass)	9	Load dispatching and operating conditions												
10	Measured Energy Performance	10	Measured Energy Performance	10	Measured Energy Performance												
11	Inspection	11	Inspection	11	Inspection												
12	Ways to Express Indoor Comfort			12	BMS												
13	External Environment Conditions																
14	Economic Calculation																
NOTE The shaded modules are not applicable.																	

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.

NOTE 1 Default references to EPB standards other than EN ISO 52000-1 are identified by the EPB module code number and given in Annex A (normative template) and Annex B (informative default choice).

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).

EN 308, *Heat exchangers — Test procedures for establishing performance of air to air heat recovery components*

CEN/TS 16628, *Energy Performance of Buildings — Basic Principles for the set of EPB standards*

CEN/TS 16629, *Energy Performance of Buildings — Detailed Technical Rules for the set of EPB-standards*

EN 1822-1, *High efficiency air filters (EPA, HEPA and ULPA) — Part 1: Classification, performance testing, marking*

EN 1886, *Ventilation for buildings — Air handling units — Mechanical performance*

EN 12599:2012, *Ventilation for buildings — Test procedures and measurement methods to hand over air conditioning and ventilation systems*

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

EN 13053, *Ventilation for buildings — Air handling units — Rating and performance for units, components and sections*

EN ISO 7345:2018, *Thermal performance of buildings and building components — Physical quantities and definitions (ISO 7345:2018)*

EN ISO 16890 (all parts), *Air filters for general ventilation (ISO 16890 (all parts))*

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

EN ISO 10121-3, *Test methods for assessing the performance of gas-phase air cleaning media and devices for general ventilation — Part 3: Classification system for GPACDs applied to treatment of outdoor air (ISO 10121-3)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003, M1-6 and M1-9, EN ISO 7345:2018, EN ISO 52000-1 and the following apply.

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

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

The terms of EN ISO 52000-1 that are indispensable for the understanding of the underlying standard are repeated here.

3.1

EPB standard

standard that complies with the requirements given in EN ISO 52000-1, CEN/TS 16628 and CEN/TS 16629

Note 1 to entry: CEN/TS 16628 and CEN/TS 16629 contain specific rules to ensure overall consistency, unambiguity, transparency and flexibility, supported by common templates. EN ISO 52000-1, the overarching EPB standard, is indispensable for each EPB standard, because of the modular structure, common terms and definitions, symbols and subscripts and because it provides the general framework for the EPB assessment.

[SOURCE: EN ISO 52000-1:2017, 3.5.14, modified – deleted original Note to entry and added new Note to entry]

3.2

room conditioning system

combination of appliances designed to keep comfort conditions in a room within a defined range

Note 1 to entry: Air conditioning systems as well as surface based systems, such as embedded systems, chilled ceilings and chilled beams, are included, see Table 13.

3.3

occupied zone

volume designed for human occupancy specified by horizontal and vertical planes

Note 1 to entry: For a description of an occupied zone see also Figure 2.

3.4

ventilation effectiveness

contamination removal effectiveness

CRE

performance of a room air distribution system and diffusion system in removing the pollutants from the occupied zone of a room given by relation between the pollution concentrations in the supply air, the extract air and the indoor air in the breathing zone (within the occupied zone)

3.5

specific fan power

amount of electric fan power divided by the air volume flow

3.6

demand controlled ventilation system

ventilation system where the ventilation rate is controlled by air quality, moisture, occupancy or some other indicator for the need of ventilation

3.7**ventilation system**

combination of appliances designed to supply interior spaces with outdoor air and to extract polluted indoor air

Note 1 to entry: The system can consist of mechanical components (e.g. combination of air handling unit, ducts and terminal units). Ventilation system can also refer to natural ventilation systems making use of temperature differences and wind with facade grills in combination with mechanical exhaust (e.g. in corridors, toilets; etc.). Both mechanical and natural ventilation can be combined with operable windows. A combination of mechanical and non-mechanical components is possible (hybrid systems).

3.8**Exhaust Air Transfer Ratio**

EATR

transfer of exhaust air into the supply air side which provides information on the ratio of exhaust air in the supply air

3.9**Outdoor Air Correction Factor**

$OACF_s$

ratio of the entering supply mass air flow rate and the leaving supply mass air flow rate, which provides information about the leakages between the air flows

3.10**design nominal air flow**

declared nominal air volume flow at a density of $1,2 \text{ kg}\cdot\text{m}^{-3}$

3.11**air conditioning system**

combination of appliances designed to supply conditioned air to a space

Note 1 to entry: For types of ventilation-, air-conditioning-, and room conditioning-systems based on functions, see Table 13.

3.12**reference conditions**

P_{SFP}

<for pressure drop> clean filters and dry conditions for other components (e.g. heat exchanger, cooling coil and humidifier)

3.13**design load conditions**

P_{SFPd}

<for pressure drop> average of clean filters and recommended maximum pressure drop and, for other components (heat exchanger, cooling coil, humidifier, etc.), the average of dry and wet values

4 Symbols and subscripts

For the purposes of this document, the symbols given in Clause 4 and in EN ISO 52000-1:2017, Annex C, EN 12792 and the specific symbols listed in Table 2 apply.

For the purposes of this document, the subscripts given in Clause 4 and in of EN ISO 52000-1:2017, Annex C apply.

Table 2 — Symbols and units

Quantity	Symbol	Unit
Pressure difference	Δp	Pa
Area	A	m ²
Costs	C	€ ^b
Concentration	c	mg·m ⁻³
Specific heat capacity at constant pressure	c_p	J·kg ⁻¹ ·K ⁻¹
Diameter	d	m
Energy consumption (measured)	E	J
Energy demand (calculated)	E	J
Exhaust Air Transfer Ratio	$EATR$	%
Specific primary energy use of ventilation	E_p	W·h·m ⁻³ ·H·a ⁻¹
Filter Efficiency (total, stage)	E_t, E_s	—
Efficiency	η	—
Specific leakage	f	m ³ ·s ⁻¹ ·m ⁻²
Primary Energy Factor	f_p	—
Present value factor	f_{pv}	—
Height	h	m
Initial Investment	I	€ ^b
Length	L	m
Life span	n	Years
Humidity load	$\dot{m}$	kg·s ⁻¹
Outdoor Air Correction Factor	$OACF_s$	—
Fan power	P	W
Pressure	p	Pa
Specific fan power	P_{SFP}	W·m ⁻³ ·s
Present value	PV	€ ^b
Thermal Energy	Q	Wh
Mass flow rate	q_m	kg·s ⁻¹
Volume flow rate	q_v	m ³ ·s ⁻¹

Quantity	Symbol	Unit
Time	t	s
Volume	V	m ³
Air velocity	v	m·s ⁻¹
Specific volume of supply air	v_{SUP}	m ³ ·kg ⁻¹ dry air
Auxiliary Energy	w	Wh
Specific humidity	x	kg·kg ⁻¹ dry air
Temperature difference	$\Delta\theta^a$	K
Contamination Removal Effectiveness (CRE)	ε_v	—
Coefficient of Performance	ε	—
Temperature	θ	°C
Air temperature in the room	θ_a	°C
Density	ρ	kg·m ⁻³
Heating or cooling load	Φ	W
Temperature ratio	Φ_t	—
^a EN 12792 prefers θ but t and T may be used as well. ^b Or National currency.		

5 Description of the method and routing

5.1 Output of the method

This document contains designing aspects in Clause 6 to Clause 8, and EPB calculation aspects in Clause 9.

5.2 General description of the method

5.2.1 Input data for energy calculation

Data in Table 3 is describing input data for EPB calculations.

Table 3 — Input data for energy calculation

Name	Symbol	Unit	Validity interval	Ref	Varying
Ventilation rate per person	$q_{V,P}$	l/s m ³ /h l/(sm ²) m ³ /(hm ²) m ³ /h Person	0 to ∞	M1-6	no
Ventilation rate for building emission	$q_{V,B}$	l/s m ³ /h l/(sm ²) m ³ /(hm ²) m ³ /h Person	0 to ∞	M1-6	no
Breathing zone ventilation	$q_{V,bz}$	l/s m ³ /h l/(sm ²) m ³ /(hm ²) m ³ /h Person	0 to ∞	M1-6	no
Specific heating energy required for outdoor air treatment	q_H	Wh/(m ³ /h a)	0 to ∞	M5-6-1	no
Delivered energy factor heat	f_H	—	0 to 1	M3-9	no
Specific cooling energy required for outdoor air treatment	q_c	Wh/(m ³ /h a)	0 to ∞	M5-6-1	no
Delivered energy factor cold	f_c		0 to 1	M4-8	no
Specific humidification generation input	e_{HU}	Wh/(m ³ /h a)	0 to ∞	M6-8	no
Primary energy factor humidifier	$F_{p,cr}$		0 to 1	M6-8	no
Primary energy factors electricity	$f_{p,S}$		0 to 1	M1-9	no
Primary energy factors heating	$f_{p,H}$		0 to 1	M4-9	no

5.2.2 Source of data for energy calculation

Input data about products that are required for the calculation described in this document shall be the data supplied by the manufacturer if they are declared according to relevant EN product standards. If such data are not declared by the manufacturer or if the required data are not product data (system data etc.), default values are given in Annex B.

Default data given in Annex B may be replaced by other data, for example nationally determined data. To ensure consistency with this calculation method, input data shall be presented according to the template given in Annex A.

NOTE Compliance with the template given in Annex A does not guarantee that the new data set is consistent.

6 Output data for energy calculation

Data in Table 4 is describing output data for EPB calculations.

Table 4 — Output data for energy calculation

Name	Symbol	Unit	Range	Intended destination	Varying
Average demand controlled air volume flow	$q_{V,dc}$	l/s m ³ /h l/(sm ²) m ³ /(hm ²)	0 to ∞	M5-2	no
Ventilation outdoor air volume flow	$q_{V,ODA}$	l/s m ³ /h l/(sm ²) m ³ /(hm ²)	0 to ∞	M5-2	no
Specific fan power	P_{SFP}	W·m ⁻³ ·s	0 to ∞	M5-2 M5-6 M5-10	no
Overall fan motor efficiency	η_e^a	—	0 to 1	M5-6 M5-10	no
Heat recovery coefficient of performance	ε	—	0 to 1	M5-6	no
Heat recovery energy efficiency	η_e^b	—	0 to 1	M5-6	no
Heat recovery temperature ratio	η_t	—	0 to 1	M5-2	no
Heat recovery humidity ratio	η_h	—	0 to 1	M5-2	no
Primary energy performance HVAC unit	$E_{P,V}$	Wh/(m ³ /h·a)	0 to ∞	M5-9 M5-10	no
^a Symbol according to Regulation (EU) No 327/2011.					
^b Symbol according to EN 13053.					

7 Indoor environment

7.1 General

Ventilation, air-conditioning or room-conditioning systems influence the following parameters:

- thermal environment;
- indoor air quality;
- indoor air humidity;
- acoustic environment.

NOTE The comfort and the performance of persons in a room is also dependent on other influences such as: type of work and configuration of working place, lighting and colours, size of room, furniture, view to the outside, working conditions and working relationships and individual factors.

The design assumptions for the indoor environment are based on design agreements. Typical design assumptions are given in 8.3 to 8.7, more basic information including categories and default values about the design criteria in M1-6 and further guidance on air quality is given in 8.7 and 8.8. The agreed requirements for the thermal environment, indoor air quality, indoor air humidity and the acoustic environment are valid for occupied zone as defined in 7.2 only. A system shall be designed for the specific needs of the project.

7.2 Occupied zone

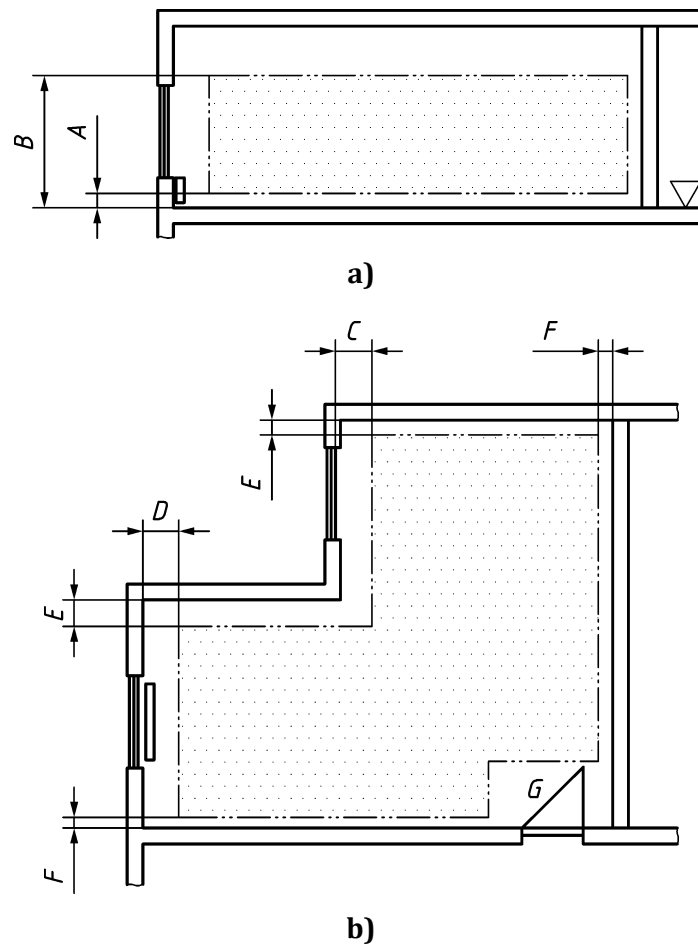
The requirements for the indoor environment shall be satisfied in the occupied zone. This means that all measurements dealing with comfort criteria shall be related to this zone. The total area of a room can be used to evaluate the requirements, but the comfort criteria are not guaranteed beyond the occupied zone.

The occupied zone is dependent on the geometry and the use of the room and shall be specified case by case.

Typical dimensions for the occupied zone are given in Table 5 and indicated in Figure 2.

Table 5 — Dimensions for the occupied zone

Distance from the inner surface of		Typical range m	Default value m
Floors (lower boundary)	A	0,00 to 0,20	0,05
Floors (upper boundary)	B	1,30 to 2,00	1,80
External windows and doors	C	0,50 to 1,50	1,00
HVAC appliances	D	0,50 to 1,50	1,00
External walls	E	0,15 to 0,75	0,50
Internal walls	F	0,15 to 0,75	0,50
Doors, transit zones etc.	G	Special agreement	—



Key

- a) vertical section
- b) plan view

Figure 2 — Description of the occupied zone

Special agreements should also be considered for the following types of zone, in which it could be difficult to meet the requirements to the thermal environment, especially with respect to draught and temperature:

- a) transit zones;
- b) zones close to doors that are often used or open;
- c) zones close to supply air terminals;
- d) zones close to units with high heat production or air flow rate.

Except when indicated or agreed otherwise, zone a) and zone b) are not considered part of the occupied zone, but zone c) and zone d) are considered part of the occupied zone.

If the use of a room is not based on the room dimensions but on other factors, the occupied zone can be defined according to the arrangement of working areas and equipment therein or by the location of the breathing zone.

8 Agreement of design criteria

8.1 General

The design criteria specify the information needed to design the system. These criteria also constitute the basis for the measurements that shall be carried out during the hand-over process. They provide the common language between all the parties including the client, designer, contractor and the operation and maintenance personnel.

Information necessary to design the system is organized on the basis of various documents outlined in 8.3 to 8.13. If the method used for dimensioning the system requires more details, they shall be provided.

Calculation procedure for the energy requirements of the ventilation and air conditioning system is presented in M5-6-1, M5-5, M4-1, M4-4, M4-9, M4-3, M4-8 considering M1-9.

8.2 Principles

Although in this document the terms “client”, “designer” or “contractor” are used to describe the function, the responsibilities are dependent on the contract. The use of these terms does not presuppose any definition of responsibility for the information. Nevertheless, if one party does not provide the information, the other shall ask for it or make and record the necessary assumptions. All key design decisions shall be agreed and documented.

The description of the characteristics of the environment and the structure of the building shall be obtained for design. The desired results required at the time of hand-over and during normal operation shall be specified and documented.

The description of the building with construction data, use and requirements is an evolving process with an increasing degree of detail and accuracy with the evolution of the project. Therefore the use of all specifications shall always be stated clearly. The details about the information needed are also dependent on the calculation method that is employed.

A classification system for the use of the building entities (M1-6) and specifying the requirements (according to this document) shall be used throughout the design.

The design requirements of all entities and usage schemes shall be specified according to this document.

8.3 General building characteristics

8.3.1 Location, outdoor conditions, neighbourhood

Information about the location of the relevant building, the significant neighbourhood characteristics such as adjacent buildings, shading, reflections, emissions, roads, airfields, sea coast, special requirements and all other information that influence the building design shall be specified in design. The category of outdoor air shall be defined in accordance with Table 8.

8.3.2 Design weather data

Information shall be given on climate data; as a minimum, design conditions for winter and summer are required, as well as annual data for energy calculation. The most important climate parameters for the design are:

- winter: outdoor temperature and wind velocity;
- summer: outdoor temperature, humidity and solar radiation.

The climate data (like a reference year, monthly or seasonal data) shall be defined in order to estimate annual energy consumption. Additional information on extreme conditions is needed to check the capacity of the system and the thermal comfort, especially possible over heating in summer.

Clause E.2 provides default values for outdoor conditions if no design weather data are specified in the agreement of design criteria.

8.3.3 Information on the operation of the building

The occupancy profile during typical days, annual periods of non-occupancy (e.g. schools, etc.), and on general operational use (e.g. weekend, night, etc.) shall be specified by using the principles of M1-6 or by using national requirements.

8.4 Construction data

All building parts shall be specified with their relevant construction data.

8.5 Geometrical description

The geometrical description including information about the orientation of the elements exposed to the outdoor environment with impact on ventilation or thermal loads (for example windows, doors, openings, shadings, walls) shall be presented, and this can be done in the form of drawings and/or tables. The specification of the net volume and floor area, room by room, is recommended.

8.6 Use of the rooms

8.6.1 General

The information about the use of each room, or group of rooms with similar use, shall be given, preferably in a table.

NOTE Further information is given in EN 12599:2012, A.1.

8.6.2 Human occupancy

The number of people constitutes a basic condition of use because the ventilation outdoor air volume flow shall be designed for this level of occupancy.

The occupancy level shall be given as schedule, for example by specifying hourly occupancy values including the activity and clothing (see M1-6).

8.6.3 Internal heat gains

Internal heat gains (people, lighting and equipment) shall be specified for the various rooms or group of rooms. The gains shall be defined as follows:

- sensible gains, convective or radiative;
- latent gains.

They shall be defined as schedules similar to occupation.

8.6.4 Internal pollution and moisture sources

The category of the building (polluting class of the building) shall be defined in accordance with M1-6. Special pollution or moisture production in a room shall be defined when relevant, with reference to the maximum limits on these pollutants that may be encountered inside the room. Each pollutant shall be defined by its schedule of emission and by the limit value to be admitted.

8.6.5 Given extract airflow

In some applications the extract air flow is given by the kind of process or equipment. In this case the extract airflow, the position and the design of the extract equipment shall be defined.

8.7 Requirements in the rooms

8.7.1 General

The requirements (desired results according to 8.1 to 8.3) and internal loads shall be specified room by room. The requirements with respect to thermal conditions and draught shall be satisfied in the occupied zone, specified in accordance with M1-6.

8.7.2 Type of control

The type of control of the indoor environment by means of the ventilation system shall be specified according to the definitions given in Table 14, and it shall be adapted to the use of the room.

8.7.3 Thermal comfort

The thermal conditions in the room shall be specified in accordance with M1-6 (human occupancy) and building and system relevant aspects.

The criteria for draft in the occupied zone shall be specified according to M1-6.

8.7.4 Air quality for people

The level of air quality required, and the method of classification applied shall be specified. The necessary air flow rates to achieve the specified requirements shall be calculated according to M1-6. The ventilation system to reach the specified air volume flows shall be specified and designed.

8.7.5 Noise level

The noise due to the ventilation and air-conditioning equipment shall not generate unacceptable noise level to the indoor and outdoor environment.

NOTE Guidance is given in CEN/TR 16798-4:2017, Table 1.

Maximum allowable sound pressure level in the room shall be specified. Typical values are given in M1-6.

8.7.6 Lighting

The impact of lighting on the design on ventilation and room conditioning systems shall be considered. Typical values for lighting levels are given in M1-6 and M9.

NOTE Lighting power requirements are given in M9.

8.8 System requirements

The relevant system requirements shall be specified.

NOTE It is advised that the system requirements also conform to existing national regulations, including those for structural fire safety and the regulations related to acoustics.

The system requirements typically include:

- location of air intake and discharge openings (see C.1);
- air filtering and filter selection, see 9.7; at least $PM_{2,5}$ and PM_{10} shall be used for ODA Classification; optionally, PM_1 may be used if local data and limits for supply air are available;
- application of humidification and dehumidification (see Table 13);
- aspects of heat recovery (see 9.6);