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NSAI Standards

Irish Standard
I.S. EN 16798-15:2017

# Energy performance of buildings - Ventilation for buildings - Part 15: Calculation of cooling systems (Module M4-7) - Storage

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## National Foreword

I.S. EN 16798-15:2017 is the adopted Irish version of the European Document EN 16798-15:2017, Energy performance of buildings - Ventilation for buildings - Part 15: Calculation of cooling systems (Module M4-7) - Storage

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 16798-15

June 2017

ICS 91.120.10; 91.140.30

English Version

# Energy performance of buildings - Ventilation for buildings - Part 15: Calculation of cooling systems (Module M4-7) - Storage

Performance énergétique des bâtiments - Ventilation des bâtiments - Partie 15 : Calcul des systèmes de refroidissement (Module M4-7) - Stockage

Energieeffizienz von Gebäuden - Teil 15: Modul M4-7 - Berechnungsmethoden für den Energiebedarf von Kälteanlagen - Speicherung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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# Contents

Page

European foreword ... 4
Introduction ... 7
1 Scope ... 9
2 Normative references ... 11
3 Terms and definitions ... 11
4 Symbols and subscripts ... 11
4.1 Symbols ... 11
4.2 Subscripts ... 11
5 Brief description of the method ... 12
5.1 Output of the method ... 12
5.2 Extension of the method ... 12
5.3 Flowchart of the calculation procedure ... 12
5.4 Technologies covered by the standard ... 13
5.5 Description of cooling systems ... 13
6 Calculation method ... 13
6.1 Output data ... 13
6.2 Calculation time interval and calculation period ... 14
6.3 Calculation period ... 14
6.4 Input data ... 15
6.4.1 Source of data ... 15
6.4.2 Product data ... 15
6.4.3 System design data ... 16
6.4.4 Operating conditions ... 18
6.4.5 Constants and physical data ... 18
6.4.6 Input data from Annex A (Annex B) ... 19
6.5 Calculation procedure, hourly method ... 19
6.5.1 Applicable time intervals ... 19
6.5.2 Operating conditions calculation ... 19
6.5.3 Energy calculation ... 19
6.6 Calculation procedure, monthly method ... 26
6.6.1 Applicable time step ... 26
6.6.2 Operating conditions calculation ... 26
6.6.3 Energy calculation ... 26
6.6.4 Simplification of formulae for the energy delivered to the storage, monthly method ... 26
7 Quality control ... 28
8 Compliance check ... 28
Annex A (normative) Input and method selection data sheet — Template ... 29
A.1 General ... 29
A.2 References ... 30
A.3 Hourly, monthly and annual method ... 30
A.3.1 Storage type ... 30
A.3.2 Product storage technical data ... 30

This is a free page sample. Access the full version online.


**A.3.3 System design data** ..... **31**
**A.3.3.1 Qualitative process design data choices** ..... **31**
**A.3.3.2 Quantitative process design data choices** ..... **31**
**A.3.3.3 Storage control options** ..... **31**
**A.4 Additional information for monthly method** ..... **31**
**Annex B** (informative) **Input and method selection data sheet — Default choices** ..... **32**
**B.1 General** ..... **32**
**B.2 References** ..... **33**
**B.3 Hourly, bin, monthly and annual method** ..... **33**
**B.3.1 Storage type** ..... **33**
**B.3.2 Product storage technical data** ..... **33**
**B.3.3 System design data** ..... **34**
**B.3.3.1 Qualitative process design data choices** ..... **34**
**B.3.3.2 Quantitative process design data choices** ..... **34**
**B.3.3.3 Process control options** ..... **35**
**B.4 Additional information for monthly and annual method** ..... **35**
**Bibliography** ..... **36**

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# European foreword

This document (EN 16798-15:2017) 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 December 2017 and conflicting national standards shall be withdrawn at the latest by December 2017.

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

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".

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 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) |

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.

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# 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 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.

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 16798-16 [4]).

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

- energy performance calculation for ventilation, air conditioning and cooling systems;
- inspection of ventilation and air conditioning systems;
- installation and commissioning of ventilation and air conditioning systems.

This standard gives the methods applicable to calculate the energy performance of the cooling storage systems.

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# 1 Scope

This European Standard specifies a calculation method for the energy performance of storage systems used for ventilation systems. It takes into account the energy performance of storage systems using water from phase change material (PCM) to store cooling energy. This standard presents a general method applicable to the different technologies of water-based storage systems or PCM related controls systems. It does not cover the cooling emission, distribution and generation that are covered by EN 15316-2, EN 15316-3 and EN 16798-13 respectively.

The standard covers typically hourly time steps but can be adapted to different time steps accordingly with the scenarios used for energy use and energy delivered or to bin method.

A simplified method is provided for monthly or annual time step.

This standard does not cover:

— the cooling emission, distribution and generation systems; or

— sizing or inspection of such storage systems.

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 52000-1:2017.

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.

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**Table 1 — Position of this standard (in casu M4–7) 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, ..** |
| **sub 1** | | **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 | | | | | | | | | |
| **7** | | Aggregation of Energy Services and Energy Carriers | | Internal Heat Gains | | Storage and control | | EN 16798-15 | | | | | | | |
| **8** | | Building zoning | | Solar Heat Gains | | Generation and control | | | | | | | | | |
| **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.

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