HOONETE ENERGIATÕHUSUS. ARVUTUSLIKU SOOJUSKOORMUSE ARVUTUSMEETOD. OSA 1: RUUMI SOOJUSKOORMUS, MOODUL M3-3

Energy performance of buildings - Method for calculation of the design heat load - Part 1: Space heating load, Module M3-3

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12831-1:2017 sisaldab Euroopa standardi EN 12831-1:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 12831-1:2017 consists of the English text of the European standard EN 12831-1:2017.
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 and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.07.2017.	Date of Availability of the European standard is 12.07.2017.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

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

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Energy performance of buildings - Method for calculation of the design heat load - Part 1: Space heating load, Module M3-3

Performance énergétique des bâtiments - Méthode de calcul de la charge thermique nominale - Partie 1 : Charge de chauffage des locaux, module M3-3

Energetische Bewertung von Gebäuden - Verfahren zur Berechnung der Norm-Heizlast - Teil 1: Raumheizlast, Modul M3-3

This European Standard was approved by CEN on 27 February 2017.

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European foreword

This document (EN 12831-1:2017) has been prepared by Technical Committee CEN/TC 228 "Heating systems and water based cooling systems in buildings", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by January 2018, and conflicting national standards shall be withdrawn at the latest by January 2018.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 supersedes EN 12831:2003.

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

EN 12831, *Energy performance of buildings — Method for the calculation of the design heat load*, is composed with the following parts:

— *Part 1: Space heating load, Module M3-3*;

— *Part 2: Explanation and justification of EN 12831-1, Module M3-3* [CEN/TR];

— *Part 3: Domestic hot water systems heat load and characterisation of needs, Module M8-2, M8-3*;

— *Part 4: Explanation and justification of EN 12831-3, Module M8-2, M8-3* [CEN/TR].

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 EPB set of standards deals with energy performance calculation and other related aspects (like system sizing) to provide the building services considered in the EPBD.

The subjects covered by CEN/TC 228 are the following:

— design of heating systems (water based, electrical, etc.);

— installation of heating systems;

— commissioning of heating systems;

— instructions for operation, maintenance and use of heating systems;

— methods for calculation of the design heat loss and heat loads;

— methods for calculation of the energy performance of heating systems.

Heating systems also include the effect of attached systems such as hot water production systems.

All these standards are systems standards, i.e. they are based on requirements addressed to the system as a whole and not dealing with requirements to the products within the system.

Where possible, reference is made to other European or International Standards, a. o. product standards. However, use of products complying with relevant product standards is no guarantee of compliance with the system requirements.

The requirements are mainly expressed as functional requirements, i.e. requirements dealing with the function of the system and not specifying shape, material, dimensions or the like.

The guidelines describe ways to meet the requirements, but other ways to fulfil the functional requirements might be used if fulfilment can be proved.

Heating systems differ among the member countries due to climate, traditions and national regulations. In some cases requirements are given as classes so national or individual needs may be accommodated.

In cases where the standards contradict with national regulations, the latter should be followed.

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 12831-2).

1 Scope

This European Standard covers methods for the calculation of the design heat load for single rooms, building entities and buildings, where the design heat load is defined as the heat supply (power) needed to maintain the required internal design temperature under design external conditions.

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 may cover more than one module and one module may 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, within the modular structure of the set of EPB standards

	Overarching		Building (as such)		Technical Building Systems									
Sub module	**Descriptions**		**Descriptions**		**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot water**	**Lighting**	**Building automation and control**	**Electricity production**
sub1		**M1**		**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
1	General		General		General	15316–1					15316–1			
2	Common terms and definitions; symbols, units and subscripts		Building Energy Needs		Needs						12831–3			
3	Applications		(Free) Indoor Conditions without Systems		Maximum Load and Power	**12831–1**					12831–3			
4	Ways to Express Energy Performance		Ways to Express Energy Performance		Ways to Express Energy Performance	15316–1					15316–1			
5	Building categories and Building Boundaries		Heat Transfer by Transmission		Emission and control	15316–2	15316–2							
6	Building Occupancy and Operating Conditions		Heat Transfer by Infiltration and Ventilation		Distribution and control	15316–3	15316–3				15316–3			

	Overarching		Building (as such)		Technical Building Systems									
Sub module	**Descriptions**		**Descriptions**		**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot water**	**Lighting**	**Building automation and control**	**Electricity production**
sub1		**M1**		**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
7	Aggregation of Energy Services and Energy Carriers		Internal Heat Gains		Storage and control	15316–5					15316–5 15316–4–3			
8	Building zoning		Solar Heat Gains		Generation									
8–1					Combustion boilers	15316–4–1					15316–4–1			
8–2					Heat pumps	15316–4–2	15316–4–2				15316–4–2			
8–3					Thermal solar Photovoltaics	15316–4–3					15316–4–3			15316–4–3
8–4					On-site cogeneration	15316–4–4					15316–4–4			15316–4–4
8–5					District heating and cooling	15316–4–5	15316–4–5							15316–4–5
8–6					Direct electrical heater	15316–4–8					15316–4–8			
8–7					Wind turbines									15316–4–10
8–8					Radiant heating, stoves	15316–4–8								

	Overarching		Building (as such)		Technical Building Systems									
Sub module	**Descriptions**		**Descriptions**		**Descriptions**	**Heating**	**Cooling**	**Ventilation**	**Humidification**	**Dehumidification**	**Domestic Hot water**	**Lighting**	**Building automation and control**	**Electricity production**
sub1		**M1**		**M2**		**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**
9	Calculated Energy Performance		Building Dynamics (thermal mass)		Load dispatching and operating conditions									
10	Measured Energy Performance		Measured Energy Performance		Measured Energy Performance	15378–3					15378–3			
11	Inspection		Inspection		Inspection	15378–1					15378–1			
12	Ways to Express Indoor Comfort			–	BMS									
13	External Environment Conditions													
14	Economic Calculation	15459–1												
NOTE 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 ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method (ISO 6946)*

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

EN ISO 9972, *Thermal performance of buildings — Determination of air permeability of buildings — Fan pressurization method (ISO 9972)*

EN ISO 10077-1, *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 1: General (ISO 10077-1)*

EN ISO 13370, *Thermal performance of buildings — Heat transfer via the ground — Calculation methods (ISO 13370)*

EN ISO 13789, *Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method (ISO 13789)*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345 and EN ISO 52000-1, and the following apply.

3.1
ATD, air terminal device
air out-/inlets allowing air transfer between external and internal air (*external ATD*) or between separate rooms (*internal ATD*)

Note 1 to entry: In the field, the term *ATD* is used for a broad variety of air out- and inlets. Within this standard, the term refers only to passive devices allowing air flow through a building element (walls, etc.) in a defined manner. It does not include air out-/inlets of fan-assisted ventilation system.

Note 2 to entry: Within this standard, it is assumed that external ATDs are only applied in unbalanced ventilation.

3.2
annual mean external temperature
mean value of the external temperature during the year

3.3
balanced ventilation
fan-assisted ventilation where the sum of all supply air volume flows equals the sum of all exhausted air volume flows in quantity and over the course of time