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SIS-CEN/TR 12831-4:2017

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Byggnaders energiprestanda – Metod för beräkning av dimensionerande värmebehov –
Del 4: Förklaring och motivering av EN 12831-3, Modul M8-2, M8-3

Energy performance of buildings – Method for calculation of the design heat load –
Part 4: Explanation and justification of EN 12831-3, Module M8-2, M8-3

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TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 12831-4

April 2017

ICS 91.120.10; 91.140.10; 91.140.65

English Version

Energy performance of buildings - Method for calculation of the design heat load - Part 4: Explanation and justification of EN 12831-3, Module M8-2, M8-3

Performance énergétique des bâtiments - Méthode de calcul de la charge thermique nominale - Partie 4 : Explication et justification de l'EN 12831-3, Modules M8-2, M8-3

Heizungsanlagen und wasserbasierte Kühlanlagen in Gebäuden - Methoden zur Berechnung der Norm-Heizlast - Teil 4: Begleitender TR zur EN 12831-3 (Heizlast von Trinkwarmwasseranlagen und Charakterisierung des Bedarfs)

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European foreword

This document (CEN/TR 12831-4:2017) 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.

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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 16628:2014, 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 16629:2014, Energy Performance of Buildings — Detailed Technical Rules for the set of EPB-standards [2];

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;

   3) a common template for the spreadsheet that accompanies each EPB standard, to demonstrate the correctness of the EPB calculation procedures.

Each EPB-standards follows the basic principles and the detailed technical rules and relates to the overarching EPB-standard, EN ISO 52000-1:2017 [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.

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.

1 Scope

This technical report refers to standard EN 12831-3, module M8-2, M8-3.

It contains information to support the correct understanding, use and national adaptation of standard EN 12831-3.

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 12831-3:2017, *Energy performance of buildings — Method for calculation of the design heat load — Part 3: Domestic hot water systems heat load and characterisation of needs*

EN 15603:2008, *Energy performance of buildings - Overall energy use and definition of energy ratings*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, EN 15603:2008, EN 12831-3:2017 apply.

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this document, the symbols given in EN 15603:2008 and EN 12831-3:2017 apply.

4.2 Subscripts

For the purposes of this document, the subscripts given in EN 15603:2008 and EN 12831-3:2017 apply.

5 Information on the methods

EN 12831-3 contains only one method.

This method provides means to estimate if, for a given situation (parameters of the DHW system; like type, tank size, etc.), hot water supply is secure.

6 Method description

6.1 Rationale, case of application

EN 12831-3 provides a method to check if, for a given setup, the hot-water supply is secure. That it does by comparing the cumulative courses of demand and available supply of energy for water heating over a certain period of time (usually a day). The result for a given setup can then be used to derive measures for the optimization of that setup, e.g.:

— undersupply → change parameters towards secure supply

— significant oversupply → optimize towards a more efficient setup (energetically and/or cost-wise).

6.2 Data input

An extensive list of all input parameters and sources that shall be used to obtain them is included in EN 12831-3.

7 Worked out example

7.1 Input data

ρ_w =	1 000	kg/m³
c_w =	4,19	kθ/kgK
θ_w =	45	°C
$\theta_{w,c}$ =	10	°C
V_{day} =	1 200	l/d
$\theta_{w,min}$ =	40	°C

Hot-water tank

V_S =	400	l
$\theta_{w,Sto,max}$ =	60	°C
$q_{B,S}$ =	3	kWh/d

Type: no distinct mixing zone

f_D =	0,9	–
$h_{sensor(on)}/h_{tank}$ =	0,5	–

Heat generator

F_D =	5	kW
$t_{V,WE}$ =	70	min

Distribution

qD =	7	W/m
L_D =	50	m
$Q_{sto,,max}$ =	21	kWh