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**Energy performance of buildings - Part 2: Accompanying
TR prEN 15232-1:2015 - Modules M10-4,5,6,7,8,9,10**

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European foreword

This document (CEN/TR 15232-2:2015) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

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

This document is currently divided into the following parts:

- *Energy performance of buildings — Part 1: Impact of Building Automation, Controls and Building Management - Modules M10-4,5,6,7,8,9,10* [currently at Enquiry stage];
- *Energy performance of buildings — Part 2: Accompanying prCEN/TR 15232-1:2015 Modules M10-4,5,6,7,8,9,10* [the present Technical Report; currently at Voting stage].

Introduction

The CENSE project, the discussions between CEN and the Concerted action highlighted the high page count of the entire package due to a lot of “textbook” information. This resulted in flooding and confusing the normative text.

A huge amount of informative contents shall indeed be recorded and available for users to properly understand, apply and nationally adapt the EPB standards

The detailed technical rules in CEN/TS 16629, "Detailed Technical Rules" ask for a clear separation between normative and informative contents:

- to avoid flooding and confusing the actual normative part with informative content;
- to reduce the page count of the actual standard;
- to facilitate understanding of the package.

Therefore each EPB standard shall be accompanied by an informative technical report, like this one, where all informative contents is collected.

Table 1 — Position of this standard within the EPB set of standards

	Over-arching	Building (as such)	Technical Building System									
Submodule	Descriptions	Descriptions	Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot waters	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									
3	Application	(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								x	
5	Building Functions and Building Boundaries	Heat Transfer by Transmission	Emission and control								x	
6	Building Occupancy and Operating Conditions	Heat Transfer by Infiltration and Ventilation	Distribution and control								x	

	Over-arching	Building (as such)	Technical Building System									
Submodule	Descriptions	Descriptions	Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot waters	Lighting	Building automation and control	PV, wind, ..
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								x	
8	Building Partitioning	Solar Heat Gains	Generation and control								x	
9	Calculated Energy Performance	Building Dynamics (thermal mass)	Load dispatching and operating conditions								x	
10	Measured Energy Performance	Measured Energy Performance	Measured Energy Performance								x	
11	Inspection	Inspection	Inspection									
12	Ways to Express Indoor Comfort		BMS									
13	External Environment Conditions											
14	Economic Calculation											

1 Scope

This Technical Report refers to prEN 15232-1, *Energy performance of buildings — Part 1: Impact of Building Automation, Controls and Building Management - Modules M10-4,5,6,7,8,9,10*.

It contains information to support the correct understanding, use and national adaption of standard prEN 15232-1:2015.

This technical report does not contain any normative provision.

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.

prEN 12098-1:2015, *Controls for heating systems — Part 1: Control equipment for hot water heating systems - Modules M3-5,6,7,8*

prEN 12098-3:2015, *Controls for heating systems — Part 3: Control equipment for electrical heating systems - Modules M3-5,6,7,8*

prEN 12098-5:2015, *Controls for heating systems — Part 3: Control equipment for electrical heating systems — Modules M3-5,6,7,8*

EN 13779, *Ventilation for non-residential buildings - Performance requirements for ventilation and room-conditioning systems*

EN 15217, *Energy performance of buildings - Methods for expressing energy performance and for energy certification of buildings*

prEN 15232-1:2015, *Energy performance of buildings — Part 1: Impact of Building Automation, Controls and Building Management — Modules M10-4,5,6,7,8,9,10*

EN 15241:2007, *Ventilation for buildings - Calculation methods for energy losses due to ventilation and infiltration in commercial buildings*

EN 15242:2007, *Ventilation for buildings - Calculation methods for the determination of air flow rates in buildings including infiltration*

EN 15243:2007, *Ventilation for buildings - Calculation of room temperatures and of load and energy for buildings with room conditioning systems*

EN 15316-1:2007, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 1: General*

EN 15316-2-1:2007, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 2-1: Space heating emission systems*

EN 15316-2-3:2007, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 2-3: Space heating distribution systems*

EN 15316-3-2, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 3-2: Domestic hot water systems, distribution*

EN 15316-3-3, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 3-3: Domestic hot water systems, generation*

EN 15316-4-1:2008, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-1: Space heating generation systems, combustion systems (boilers)*

EN 15316-4-2, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-2: Space heating generation systems, heat pump systems*

EN 15316-4-4, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-4: Heat generation systems, building-integrated cogeneration systems*

EN 15316-4-5, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-5: Space heating generation systems, the performance and quality of district heating and large volume systems*

EN 15316-4-6, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-6: Heat generation systems, photovoltaic systems*

EN 15316-4-7, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-7: Space heating generation systems, biomass combustion systems*

EN 15378, *Heating systems in buildings - Inspection of boilers and heating systems*

EN 15239, *Ventilation for buildings - Energy performance of buildings - Guidelines for inspection of ventilation systems*

EN 15240, *Ventilation for buildings - Energy performance of buildings - Guidelines for inspection of air-conditioning systems*

prEN 15500-1:2015, *Control for heating, ventilating and air-conditioning applications — Part 1: Electronic individual zone control equipment — Modules M3-5, M4-5, M5-5*

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

prEN 16798-5-1, *Energy performance of buildings — Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 — Ventilation for buildings — Calculation methods for energy requirements of ventilation and air conditioning systems — Part 5-1: Distribution and generation (revision of EN 15241) — Method 1*

prEN 16798-5-2:2015, *Energy performance of buildings — Modules M5-6, M5-8 — Ventilation for buildings — Calculation methods for energy requirements of ventilation systems — Part 5-2: Distribution and generation (revision of EN 15241) — method 2*

prEN 16798-7:2014, *Energy performance of buildings — Part 7: Ventilation for buildings — Modules M5-1, M5-5, M5-6, M5-8 — Calculation methods for the determination of air flow rates in buildings including infiltration*

prEN 16947-1:2015, *Building Management System — Module M10-12*

FprCEN/TR 16947-2:2015, *Accompanying TR for New Work Item — Building Management System*

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

EN ISO 13790:2008, *Energy performance of buildings - Calculation of energy use for space heating and cooling (ISO 13790:2008)*

EN ISO 16484-3:2005, *Building automation and control systems (BACS) - Part 3: Functions (ISO 16484-3:2005)*

prEN ISO 52000-1:2015, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures (ISO/DIS 52000-1:2015)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, prEN ISO 52000-1:2015 and prEN 15232-1:2015 (the accompanied EPB standard) apply.

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this Technical Report, the symbols given in prEN ISO 52000-1:2015, in EN 15232-1:2015 (the accompanied EPB standard) apply.

4.2 Abbreviations

For the purposes of this Technical Report, the abbreviations in prEN 15232-1:2015 (the accompanied EPB standard) apply.

5 Method description

5.1 Effect of building automation and control (BAC) and technical building management (TBM)

5.1.1 General

The key-role of Building Automation and Control and TBM is to ensure the balance between the desired human comfort - which shall be maximal, and energy used to obtain this goal - which shall be minimal!

The scope of BAC and TBM covers in accordance with their role from one side all Technical Building Systems (where the effect of the BAC is used in the calculation procedures) and from another side the global optimization Energy Performance of a Building.

We could identify several categories of controls:

- Technical Building Systems specific controls; these controllers are dedicated to the physical chain of transformation of the energy, from Generation, to Storage, Distribution and Emission. We find them in the matrix starting with the Modules M3-5 to M9-5 and finishing with M3-8 till M9-8. We could consider that it exist one controller by module, but some time one controller do the control among several modules. More often, these controllers are communicating between them via a standardized open bus, such as BACnet, KNX or LON
- BAC used for all or several Technical Building Systems who do multidiscipline (heating, cooling, ventilation, DHW, lighting...) optimization and complex control functions. For example, one of them is INTERLOCK, a control function who avoids heating and cooling in same time.
- If all Technical Building System are used in the building, we have (depending of the size of the building) a Technical Building Management System. Specific global functions are implemented here, necessary to reach the key-role mentioned above. Usually, in this case, an interrelation with the