

HOONETE ENERGIATÕHUSUS. HOONE AUTOMAAATIKA,  
JUHTIMISE JA TEHNILISE HOONEHALDUSE ÜLEVAATUS.  
OSA 1: MOODULID M10-11

Energy Performance of Buildings - Inspection of  
Automation, Controls and Technical Building  
Management - Part 1: Module M10-11

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 16946-1:2017 sisaldab Euroopa standardi EN 16946-1:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 16946-1:2017 consists of the English text of the European standard EN 16946-1:2017.
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English Version

Energy Performance of Buildings - Inspection of  
Automation, Controls and Technical Building Management  
- Part 1: Module M10-11

Performance énergétique des bâtiments - Inspection  
des systèmes d'automatisation, de régulation et de  
gestion technique des bâtiments - Partie 1 : Module  
M10-11

Energetische Bewertung von Gebäuden- Inspektion der  
Gebäudeautomation, Regelungstechnik und des  
Technischen Gebäudemanagements - Teil 1: Modul  
M10-11

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

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COMITÉ EUROPÉEN DE NORMALISATION  
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## European foreword

This document (EN 16946-1:2017) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

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of an identical text or by endorsement, at the latest by October 2017, and conflicting national standards shall be withdrawn at the latest by October 2017.

This document is part of the set of standards on the energy performance of buildings (the set of EPB standards) and has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480, [6]), and supports essential requirements of EU Directive 2010/31/EC on the energy performance of buildings (EPBD, [7]).

In case this 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, in particular for the application within the context of EU Directives transposed into national legal requirements.

Further target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD art.11.9) and any other regional (e.g. Pan European) parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

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

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, 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 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 “EPB set of standards”.

As part of the “EPB set of standards” it complies with the requirements for the set of basic EPB documents EN ISO 52000-1:2017 (see Normative references), CEN/TS 16628 and CEN/TS 16629 (see bibliography [2] and [3]) developed under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480), and supports essential requirements of EU Directive 2010/31/EU on the energy performance of buildings (EPBD).

The standards issued by TC 247 for M/480 belong to the EPB set of standards and are in line with the over-arching standard (EN ISO 52000-1:2017) and drafted in accordance with the basic principles and detailed technical rules developed in the Phase I of the mandate.

Also these standards are clearly identified in the modular structure developed to ensure a transparent and coherent EPB standard set. BAC (Building Automation and Control) is identified in the modular structure as Technical Building System M10. However, the standards of TC 247 deal with control accuracy, control functions and control strategies using standards communications protocol (these last standards do not belong to the EPB standards set).

To avoid a duplication of calculation due to the BAC (avoid double impact), no calculation are done in BAC EPB standard set, but in each underlying standard of EPB set of standards (from M1 to M9 in the Modular Structure), an IDENTIFIER developed and present in the M10 covered by EN 15232-1:2017 is used where appropriate. These way of interaction is described in detailed in the Technical Report (CEN ISO/TR 52000-2:2017) accompanying the over-arching standard. As consequence, the Annex A and Annex B concept as EXCEL sheet with the calculation formulas used in the EPB standards are not applicable for the standards issued by TC 247 for M/480.

The main target groups of this standard are all the users of the set of EPB standards (e.g. architects, engineers, regulators).

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 16946-2:2016 [1]).

## 1 Scope

This European Standard defines guidelines for the inspection of installed and operational functions of Building Automation, Controls and Technical Building Management System including its configuration.

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 52000-2:2017 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.

**Table 1 — Position of this standard (in casu M10–11), within the modular structure of the set of EPB 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									
5	Building Functions 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									

	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									
8	Building Partitioning	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								x	
12	Ways to Express Indoor Comfort		BMS									
13	External Environment Conditions											
14 <sup>a</sup>	Economic Calculation											

<sup>a</sup> 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 52000-1:2017, *Energy performance of buildings – Overarching EPB assessment – Part 1: General framework and procedures*

EN ISO 16484-1, *Building automation and control systems (BACS) - Part 1: Project specification and implementation (ISO 16484-1:2010)*

EN 15232-1:2017, *Energy performance of buildings - Part 1: Impact of Building Automation, Controls and Building Management - Modules M10-4, 5, 6, 7, 8, 9, 10*

CEN/TR 15232-2:2016, *Energy performance of buildings - Part 2: Accompanying TR prEN 15232-1:2015 - Modules M10-4,5,6,7,8,9,10*

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, in EN ISO 52000-1:2017 apply.

## 4 Overview

Building Automation and Controls including Technical Building Management (BAC) contribute to the energy performance of buildings. BAC performance has a tendency to decline over time if not actively checked, maintained and adapted to the actual use of the building (independent of the building type). This performance depends on a number of factors. Some of the factors are:

- building / space usage changes;
- equipment maintenance and re-commissioning;
- manual interventions and missing “back to “normal” change;
- manual set point adjustments and back to “normal” procedure;
- plant performance issues;
- control issues and control equipment issues;
- misplaced sensors and mounting issues;
- etc.

The requirements in this standard describe a method and its steps and its 2 pillow approach to maintain the desired performance over time.

The inspection method basically delivers a tool variant (e.g. EXCEL) that allows keeping track of the inspected BAC portions.