

**Energy performance of buildings - Impact of Building Automation, Controls and Building Management**

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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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.
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## English Version

**Energy performance of buildings - Impact of Building  
Automation, Controls and Building Management**

Performance énergétique des bâtiments - Impact de  
l'automatisation, de la régulation et de la gestion technique

Energieeffizienz von Gebäuden - Einfluss von  
Gebäudeautomation und Gebäudemanagement

This European Standard was approved by CEN on 27 November 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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## Foreword

This document (EN 15232:2012) 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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

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 supersedes EN 15232:2007.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

This European Standard was created to establish conventions and methods for estimation of the impact of building automation and control systems (BACS) and technical building management (TBM) on energy performance and energy use in buildings.

This European Standard also provides guidance for taking BACS and TBM functions as far as possible into account in the relevant standards prepared under the mandate M/343. Therefore, it is coordinated between CEN/TC 247 and CEN/TC 89, CEN/TC 156, CEN/TC 169 and CEN/TC 228 to support these TCs by strong cooperation in specifying how the impact of the BACS and TBM functions are taken into account in their standards. The results concerning BACS and TBM in the relevant standards are summarized in Clause 5.

This European Standard specifies a method to estimate energy saving factors which can be used in conjunction with energy assessment of buildings. This European Standard supplements a series of standards which are drafted to calculate the energy efficiency of technical building services, e.g. heating, cooling, ventilation, lighting systems. This European Standard takes into account the fact that with BACS and TBM the energy consumption of a building can be reduced.

This European Standard should be used for existing buildings and for design of new or renovated buildings.

## 1 Scope

This European Standard specifies:

- a structured list of Building Automation and Control System (BACS) and Technical Building Management (TBM) functions which have an impact on the energy performance of buildings;
- a method to define minimum requirements regarding BACS and TBM functions to be implemented in buildings of different complexities;
- a factor based method to get a first estimation of the impact of these functions on typical buildings;
- detailed methods to assess the impact of these functions on a given building. These methods enable to introduce the impact of these functions in the calculations of energy performance ratings and indicators calculated by the relevant standards.

This European Standard is defined for:

- building owners, architects or engineers, defining the functions to be implemented for a given new building or for the renovation of an existing building;
- public authorities, defining minimum requirements for BACS and TBM functions for new buildings as well as for renovation, as defined in the relevant standard;
- public authorities, defining inspection procedures of technical systems as well as inspectors applying these procedures to check if the level of BACS and TBM functions implemented is appropriate;
- public authorities, defining calculation methods which take into account the impact of BACS and TBM functions on the energy performance of buildings as well as software developers implementing these calculation methods and designers using them;
- designers, checking that the impact of all BACS and TBM functions are taken into account when assessing the energy performance of a building.

**NOTE** The terms BAC (Building Automation and Control) and BACS (Building Automation and Control System) are equivalent in view of energy calculation and energy efficiency. In this case BACS will be used in the English version and BAC (German term: "GA Gebäudeautomation") in the German version.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12098-1, *Controls for heating systems — Part 1: Outside temperature compensated control equipment for hot water heating systems*

EN 12098-2, *Controls for heating systems — Part 2: Optimum start-stop control equipment for hot water heating systems*

EN 12098-3, *Controls for heating systems — Part 3: Outside temperature compensated control equipment for electrical heating systems*

EN 12098-4, *Controls for heating systems — Part 4: Optimum start-stop control equipment for electrical systems*

- EN 12098-5, *Controls for heating systems — Part 5: Start-stop schedulers for heating systems*
- EN 13779, *Ventilation for non-residential buildings — Performance requirements for ventilation and room-conditioning systems*
- EN 15193:2007, *Energy performance of buildings — Energy requirements for lighting*
- EN 15217:2007, *Energy performance of buildings — Methods for expressing energy performance and for energy certification of buildings*
- 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*
- EN 15241:2007, *Ventilation for buildings — Calculation method 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 15243:2005, *Ventilation for buildings — Calculation of room temperatures and of load and energy for buildings with room conditioning systems*
- EN 15255, *Energy performance of buildings — Sensible room cooling load calculation — General criteria and validation procedures*
- 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 15316-3-2:2007, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 3-2: Domestic hot water systems, distribution*
- EN 15316-3-3:2007, *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, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-1: Space heating generation 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 15316-4-3, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-3: Heat generation systems, thermal solar 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 15500:2008, *Control for heating, ventilating and air-conditioning applications — Electronic individual zone control equipment*

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

EN 16001 2009, *Energy management systems — Requirements with guidance for use*

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)*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 The terms and definitions listed in this standard but defined by other relevant ISO/IEC International Standards and/or European Standards are repeated below for convenience in most cases.

NOTE 2 Other language versions may contain an alphabetical index in national annexes.

#### 3.1

##### **auxiliary energy**

electrical energy used by heating, cooling and/or domestic water systems to transform and transport the delivered energy into the useful energy

NOTE 1 This includes energy for fans, pumps, electronics etc., but not the energy that is transformed. Pilot flames are considered as part of the energy use by the system.

NOTE 2 In EN ISO 9488 the energy used for pumps and valves is called "parasitic energy".

[CEN/TR 15615]

#### 3.2

##### **building automation and controls**

##### **BAC**

description for products, software, and engineering services for automatic controls, monitoring and optimization, human intervention and management to achieve energy – efficient, economical and safe operation of building services equipment

NOTE The trade designation and the industry branch are also referred to as building automation and/or building control.

[EN ISO 16484-2:2004]

#### 3.3

##### **building automation and control systems**

##### **BACS**

comprising all products and engineering services for automatic controls (including interlocks), monitoring,