

**Thermal performance of buildings -
Calculation of energy use for space
heating and cooling - General criteria
and validation procedures**

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energy use for space heating and cooling - General
criteria and validation procedures

EESTI STANDARDI EESSÖNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 15265:2007 sisaldab Euroopa standardi EN 15265:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 30.10.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 15265:2007 consists of the English text of the European standard EN 15265:2007.</p> <p>This document is endorsed on 30.10.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This European Standard specifies a set of assumptions, requirements and validation tests for procedures used for the calculation of the annual energy needs for space heating and cooling of a room in a building where the calculations are done with a time step of one hour or less. This European Standard does not impose any specific numerical technique for the calculation of the room heating or cooling need and the internal temperatures of a room.</p>	<p>Scope: This European Standard specifies a set of assumptions, requirements and validation tests for procedures used for the calculation of the annual energy needs for space heating and cooling of a room in a building where the calculations are done with a time step of one hour or less. This European Standard does not impose any specific numerical technique for the calculation of the room heating or cooling need and the internal temperatures of a room.</p>
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English Version

Energy performance of buildings - Calculation of energy needs for space heating and cooling using dynamic methods - General criteria and validation procedures

Performance thermique des bâtiments - Calcul des besoins
d'énergie pour le chauffage et le refroidissement des locaux
- Critères généraux et procédures de validation

Wärmetechnisches Verhalten von Gebäuden - Berechnung
des Heiz- und Kühlenergieverbrauchs - Allgemeine
Kriterien und Validierungsverfahren

This European Standard was approved by CEN on 6 July 2007.

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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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 15265:2007) has been prepared by Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS.

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 February 2008, and conflicting national standards shall be withdrawn at the latest by February 2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/343), and supports essential requirements of EU Directive 2002/91/EC on the energy performance of buildings (EPBD). It forms part of a series of standards aimed at European harmonisation of the methodology for the calculation of the energy performance of buildings. An overview of the whole set of standards is given in prCEN/TR 15615.

Attention is drawn to the need for observance of EU Directives transposed into national legal requirements. Existing national regulations (with or without reference to national standards) may restrict for the time being the implementation of this European Standard.

This European Standard is one of a series of standards on general criteria and validation procedures for transient calculation methods for the design and the evaluation of the thermal and energy performance of buildings and building components. No existing European Standard is superseded.

The target audience of this European Standard are software developers of building simulation tools and policy makers in the building regulation sector. The standard specifies the boundary conditions and the simplifications needed to reach calculation results for the building part which are comparable.

It needs to be emphasized that there exist more sophisticated energy simulation methods and procedures including interactions with the heating, cooling, ventilating and lighting systems which may be used for the design and optimization process of a building without being necessarily covered by existing European Standards.

This European Standard provides the means (in part) to assess the contribution that building products and services make to energy conservation and to the overall energy performance of buildings.

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, 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 and United Kingdom.

Introduction

This European Standard defines assumptions, boundary conditions and a procedure for the validation of dynamic calculation methods for the calculation of the annual energy need for space heating and cooling of a building or a part of it.

This way, the same dynamic method used for calculating design heating and cooling loads can provide also the cooling and heating needs necessary to estimate annual energy requirements.

The series of European Standards, giving general criteria and validation procedures for the building part of energy simulation models for the different calculation subjects, are listed below.

European Standard	Subject
EN ISO 13791 EN ISO 13792	Temperature calculations (air and operative)
EN 15255	Load calculations (sensible cooling)
EN 15265	Energy need calculations (heating and cooling)

1 Scope

This European Standard specifies a set of assumptions, requirements and validation tests for procedures used for the calculation of the annual energy needs for space heating and cooling of a room in a building where the calculations are done with a time step of one hour or less.

This European Standard does not impose any specific numerical technique for the calculation of the room heating or cooling need and the internal temperatures of a room.

The purpose of this European Standard is to validate calculation methods used to:

- assess the energy performance of each room of a building;
- provide energy data to be used as interface with system performance analysis (heating, cooling, ventilating, lighting, domestic hot water etc).

The validation procedure is used to check the energy need for space heating and cooling based on a transient sensible heat balance model, taking into account:

- the external surface heat balance;
- the conduction through the building envelope;
- the thermal capacities of external and internal structures;
- the internal surface heat balance;
- the air heat balance;
- the heat balance solution method.

All other aspects are given either by prescribed boundary conditions or by input data and are not part of the model validation. It is assumed, that for all these other matters e.g. embedded heating and cooling systems, prescriptive models have to be used according to existing European Standards.

The system performance analysis and moisture balance are not within the scope of this European Standard.

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 15241, *Ventilation for buildings — Calculation methods for energy losses due to ventilation and infiltration in commercial buildings*

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

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

prEN ISO 10211, *Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations (ISO/DIS 10211:2005)*

prEN ISO 13370, *Thermal performance of buildings — Heat transfer via the ground — Calculation methods (ISO/DIS 13370:2005)*

prEN ISO 13790, *Energy performance of buildings — Calculation of energy use for space heating and cooling (ISO/DIS 13790:2005)*

prEN ISO 14683, *Thermal bridges in building construction — Linear thermal transmittance — Simplified methods and default values (ISO/DIS 14683:2005)*

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995 and the following apply.

3.1.1

energy need for heating or cooling

heat to be delivered to or extracted from a conditioned space to maintain the intended temperature conditions during a given period of time

NOTE 1 The energy need is calculated and cannot easily be measured.

NOTE 2 The energy need can include additional heat transfer resulting from non-uniform temperature distribution and non-ideal temperature control, if they are taken into account by increasing (decreasing) the effective temperature for heating (cooling) and not included in the heat transfer due to the heating (cooling) system.

3.1.2

energy use for space heating or cooling or domestic hot water

energy input to the heating, cooling or hot water system to satisfy the energy need for heating, cooling (including dehumidification) or hot water respectively

NOTE If the technical building system serves several purposes (e.g. heating and domestic hot water) it can be difficult to split the energy use into that used for each purpose. It can be indicated as a combined quantity (e.g. energy need for space heating and domestic hot water).

3.1.3

envelope element

element of a building fabric delimited by two parallel surfaces, separating the room under consideration from the outdoor climate or another space

3.1.4

internal air temperature

temperature of the room air

3.1.5

internal environment

closed space delimited from the external environment or adjacent spaces by a building fabric component

3.1.6

internal surface temperature

temperature of the internal surface of each room element

3.1.7

mean radiant temperature

uniform surface temperature of an enclosure in which an occupant would exchange the same amount of radiant heat as in the actual non-uniform enclosure