

**Sisekeskkonna lähteparameetrid hoonete
energiatõhususe projekteerimiseks ja hindamiseks
lähtudes siseõhu kvaliteedist, soojuslikust
mugavusest, valgustusest ja akustikast**

Indoor environmental input parameters for design and
assessment of energy performance of buildings
addressing indoor air quality, thermal environment,
lighting and acoustics

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15251:2007 sisaldab Euroopa standardi EN 15251:2007 ingliskeelset teksti.

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Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

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English Version

**Indoor environmental input parameters for design and
assessment of energy performance of buildings addressing
indoor air quality, thermal environment, lighting and acoustics**

Critères pour l'environnement intérieur et évaluation des
performances énergétiques des bâtiments couvrant la
qualité d'air intérieur, la thermique, l'éclairage et
l'acoustique

Eingangsparameter für das Raumklima zur Auslegung und
Bewertung der Energieeffizienz von Gebäuden -
Raumluftqualität, Temperatur, Licht und Akustik

This European Standard was approved by CEN on 26 March 2007.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 15251:2007) has been prepared by Technical Committee CEN/TC 156 "Ventilation for buildings", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2007, and conflicting national standards shall be withdrawn at the latest by November 2007.

This standard 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 CEN/TR 15615, Explanation of the general relationship between various CEN standards and the Energy Performance of Buildings Directive (EPBD) ("Umbrella document").

Attention is drawn to the need for observance of relevant 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 the European Standards mentioned in this report.

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

Energy consumption of buildings depends significantly on the criteria used for the indoor environment (temperature, ventilation and lighting) and building (including systems) design and operation. Indoor environment also affects health, productivity and comfort of the occupants. Recent studies have shown that costs of poor indoor environment for the employer, the building owner and for society, as a whole are often considerable higher than the cost of the energy used in the same building. It has also been shown that good indoor environmental quality can improve overall work and learning performance and reduce absenteeism. In addition uncomfortable occupants are likely to take actions to make themselves comfortable which may have energy implications. An energy declaration without a declaration related to the indoor environment makes no sense. There is therefore a need for specifying criteria for the indoor environment for design, energy calculations, performance and operation of buildings.

There exist national and international standards, and technical reports, which specify criteria for thermal comfort and indoor air quality (EN ISO 7730, CR 1752). These documents do specify different types and categories of criteria, which may have a significant influence on the energy demand. For the thermal environment criteria for the heating season (cold/winter) and cooling season (warm/summer) are listed. These criteria are, however, mainly for dimensioning of building, heating, cooling and ventilation systems. They may not be used directly for energy calculations and year-round evaluation of the indoor thermal environment. New results have shown that occupant expectations in natural ventilated buildings may differ from conditioned buildings. These issues are not dealt with in detail in the above mentioned documents.

The present standard specifies how design criteria can be established and used for dimensioning of systems. It defines how to establish and define the main parameters to be used as input for building energy calculation and long term evaluation of the indoor environment. Finally this standard will identify parameters to be used for monitoring and displaying of the indoor environment as recommended in the Energy Performance of Buildings Directive.

Different categories of criteria may be used depending on type of building, type of occupants, type of climate and national differences. The standard specifies several different categories of indoor environment which could be selected for the space to be conditioned. These different categories may also be used to give an overall, yearly evaluation of the indoor environment by evaluating the percentage of time in each category. The designer may also select other categories using the principles from this standard.

1 Scope

- This European Standard specifies the indoor environmental parameters which have an impact on the energy performance of buildings.
- The standard specifies how to establish indoor environmental input parameters for building system design and energy performance calculations.
- The standard specifies methods for long term evaluation of the indoor environment obtained as a result of calculations or measurements.
- The standard specifies criteria for measurements which can be used if required to measure compliance by inspection.
- The standard identifies parameters to be used by monitoring and displaying the indoor environment in existing buildings.
- This standard is applicable mainly in non-industrial buildings where the criteria for indoor environment are set by human occupancy and where the production or process does not have a major impact on indoor environment. The standard is thus applicable to the following building types: single family houses, apartment buildings, offices, educational buildings, hospitals, hotels and restaurants, sports facilities, wholesale and retail trade service buildings.
- The standard specifies how different categories of criteria for the indoor environment can be used. But does not require certain criteria to be used. This is up to national regulations or individual project specifications.
- The recommended criteria in this standard can also be used in national calculation methods, which may be different to the methods referred to here.
- The standard does not prescribe design methods, but give input parameters to the design of buildings, heating, cooling, ventilation and lighting systems.
- The standard does not include criteria for local discomfort factors like draught, radiant temperature asymmetry, vertical air temperature differences and floor surface temperatures.

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 12464-1	2002	<i>Light and lighting — Lighting of work places — Part 1: Indoor work places</i>
EN 12599		<i>Ventilation for buildings — Test procedures and measuring methods for handing over installed ventilation and air conditioning systems</i>
EN 12792	2003	<i>Ventilation for buildings — Symbols, terminology and graphical symbols</i>
EN 12831		<i>Heating systems in buildings — Method for calculation of the design heat load</i>

EN 15193		<i>Energy performance of buildings — Energy requirements for lighting</i>
EN 15241		<i>Ventilation for buildings — Calculation methods for energy losses due to ventilation and infiltration in commercial buildings</i>
EN 15242		<i>Ventilation for buildings — Calculation methods for the determination of air flow rates in buildings including infiltration</i>
prEN 15255		<i>Thermal performance of buildings — Sensible room cooling load calculation — General criteria and validation procedures</i>
prEN 15265		<i>Thermal performance of buildings — Calculation of energy needs for space heating and cooling using dynamic methods — General criteria and validation procedures</i>
EN ISO 7726		<i>Ergonomics of the thermal environment — Instruments for measuring physical quantities (ISO 7726:1998)</i>
EN ISO 7730		<i>Ergonomics of the thermal environment — Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria (ISO 7730:2005)</i>
EN ISO 8996		<i>Ergonomics of the thermal environment — Determination of metabolic rate (ISO 8996:2004)</i>
EN ISO 9920		<i>Ergonomics of the thermal environment — Estimation of the thermal insulation and evaporative resistance of a clothing ensemble (ISO 9920:1995)</i>
EN ISO 13731	2001	<i>Ergonomics of the thermal environment — Vocabulary and symbols (ISO 13731:2001)</i>
EN ISO 13790		<i>Thermal performance of buildings — Calculation of energy use for space heating (ISO 13790:2004)</i>
ISO/TS 14415		<i>Ergonomics of the thermal environment — Application of International Standards to people with special requirements</i>
CIE 69		<i>Methods of characterizing illuminance meters and luminance meters; performance, characteristics and specifications</i>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003, EN ISO 13731:2001, EN 12464-1:2002 and the following apply.

3.1

adaptation

physiological, psychological or behavioural adjustment of building occupants to the interior thermal environment in order to avoid discomfort

NOTE In naturally ventilated buildings these are often in response to changes in indoor environment induced by outside weather conditions.