EESTI STANDARD

Hoonete ventilatsioon. Hoonetes õhuhulkade, sh.infiltratsiooni määramise meetodid

Ventilation for buildings - Calculation methods for the determination of air flow rates in buildings including infiltration

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15242:2007 sisaldab Euroopa standardi EN 15242:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 21.06.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 15242:2007 consists of the English text of the European standard EN 15242:2007. This document is endorsed on 21.06.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard describes the method to calculate the ventilation air flow rates for buildings to be used for applications such as energy calculations, heat and cooling load calculation, summer comfort and indoor air quality evaluation. The ventilation and air tightness requirements (as IAQ, heating and cooling, safety, fire protection…) are not part of the standard. For these different applications, the same iterative method is used but the input parameter should be selected according to the field of application. For specific applications a direct calculation is also defined in this standard. A simplified approach is also allowed at national level following prescribed rules of implementation.	**Scope:** This European Standard describes the method to calculate the ventilation air flow rates for buildings to be used for applications such as energy calculations, heat and cooling load calculation, summer comfort and indoor air quality evaluation. The ventilation and air tightness requirements (as IAQ, heating and cooling, safety, fire protection…) are not part of the standard. For these different applications, the same iterative method is used but the input parameter should be selected according to the field of application. For specific applications a direct calculation is also defined in this standard. A simplified approach is also allowed at national level following prescribed rules of implementation.

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Võtmesõnad:

EUROPEAN STANDARD

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English Version

Ventilation for buildings - Calculation methods for the determination of air flow rates in buildings including infiltration

Ventilation des bâtiments - Méthodes de calcul pour la détermination des débits d'air y compris les infiltrations dans les bâtiments

Lüftung von Gebäuden - Berechnungsverfahren zur Bestimmung der Luftvolumenströme in Gebäuden einschließlich Infiltration

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

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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Contents

Foreword

This document (EN 15242:2007) 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

This standard defines the way to calculate the airflows due to the ventilation system and infiltration. The relationships with some other standards are as follows:
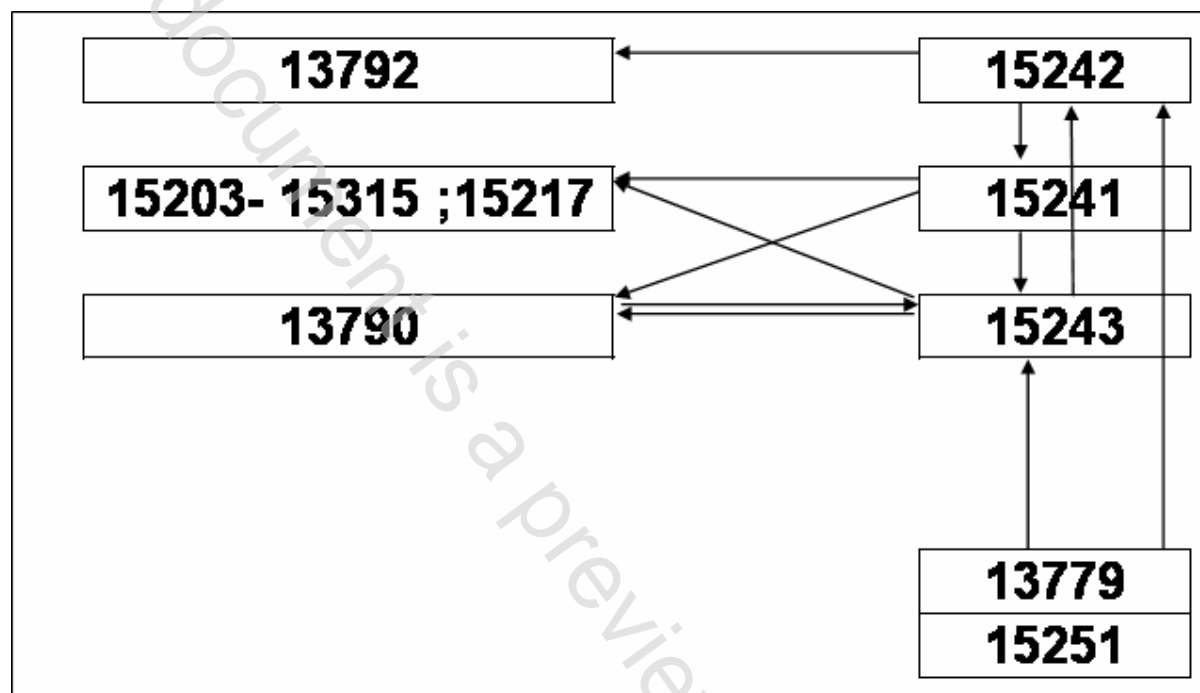

Figure 1 — scheme of relationship between standards

Table 1 — Relationship between standards

from	To	Information transferred	variables
15251	15243	Indoor climate requirements	Heating and cooling Set points
13779 15251	15242	Airflow requirement for comfort and health	Required supply and exhaust Air flows
15242	15241	Air flows	Air flows entering and leaving the building
15241	13792	Air flows	Air flow for summer comfort calculation
15241	15203- 15315 ;15217	energy	Energies per energy carrier for ventilation (fans, humidifying, precooling, pre heating), + heating and cooling for air systems
15241	13790	data for heating and cooling calculation	Temperatures, humilities and flows of air entering the building

15243	15243	Data for air systems	Required energies for heating and cooling
15243	15242	Data for air heating and cooling systems	Required airflows when of use
15243	13790	data for building heating and cooling calculation	Set point, emission efficiency, distribution recoverable losses, generation recoverable losses
13790	15243	Data for system calculation	Required energy for generation

EN titles are:

prEN 15217 *Energy performance of buildings — Methods for expressing energy performance and for energy certification of buildings*

prEN 15603 *Energy performance of buildings - Overall energy use and definition of energy ratings*

prEN 15243 *Ventilation for buildings — Calculation of room temperatures and of load and energy for buildings with room conditioning systems*

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

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

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

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

EN 13792 *Colour coding of taps and valves for use in laboratories*

EN 15251 *Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics*

The calculation of the airflows through the building envelope and the ventilation system for a given situation is first described (Clause 6). Applications depending on the intended uses are described in Clause 7.

The target audience of this standard is policy makers in the building regulation sector, software developers of building simulation tools, industrial and engineering companies.

1 Scope

This European Standard describes the method to calculate the ventilation air flow rates for buildings to be used for applications such as energy calculations, heat and cooling load calculation, summer comfort and indoor air quality evaluation.

The ventilation and air tightness requirements (as IAQ, heating and cooling, safety, fire protection…) are not part of the standard.

For these different applications, the same iterative method is used but the input parameter should be selected according to the field of application. For specific applications a direct calculation is also defined in this standard. A simplified approach is also allowed at national level following prescribed rules of implementation.

The method is meant to be applied to:

— Mechanically ventilated building (mechanical exhaust, mechanical supply or balanced system).

— Passive ducts.

— Hybrid system switching between mechanical and natural modes.

— Windows opening by manual operation for airing or summer comfort issues.

Automatic windows (or openings) are not directly considered here.

Industry process ventilation is out of the scope.

Kitchens where cooking is for immediate use are part of the standards (including restaurants..)

Other kitchens are not part of the standard.

The standard is not directly applicable for buildings higher than 100 m and rooms where vertical air temperature difference is higher than 15K.

The results provided by the standard are the building envelope flows either through leakages or purpose provided openings and the air flows due to the ventilation system, taking into account the product and system characteristics.

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 1507, *Ventilation for buildings — Sheet metal air ducts with rectangular section — Requirements for strength and leakage*

EN 1886, *Ventilation for buildings — Air handling units — Mechanical performance*

EN 12237, *Ventilation for buildings — Ductwork — Strength and leakage of circular sheet metal ducts*

EN 12792:2003, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 13141-5, *Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 5: Cowls and roof outlet terminal devices*

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

EN 14239, *Ventilation for buildings — Ductwork — Measurement of ductwork surface area*

EN 15251, *Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics*

prEN 15255, *Thermal performance of buildings — Sensible room cooling load calculation — General criteria and validation procedures*

3   Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003 and the following apply.

3.1
building height
height of the building from the entrance ground level to the roof top level

3.2
vertical duct
duct or shaft, including flue or chimney, which is mainly vertical and not closed

3.3
building envelope leakage
overall leakage airflow for a given test pressure difference across building

3.4
building volume
volume within internal outdoor walls of the purposely conditioned space of the building (or part of the building)

NOTE   This generally includes neither the attic, nor the basement, nor any additional structural annex of the building.

3.5
building air temperature
average air temperature of the rooms in the occupied zone

3.6
iterative method
calculation method that requires a mathematical solver to solve an equation by iteration

3.7
direct method
calculation method that can be applied manually

3.8
vent (or opening)
opening intended to act as an air transfer device

3.9
reference wind speed at site
wind speed at site, at a height of 10 m, in undisturbed shielding conditions