

**Hoonete küttesüsteemid. Süsteemide  
energiavajaduse ja süsteemide  
tõhususe arvutusmeetod. Osa 1: Üldist**

Heating systems in buildings - Method for calculation  
of system energy requirements and system  
efficiencies - Part 1: General

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 15316-1:2007 sisaldab Euroopa standardi EN 15316-1:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 14.09.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 15316-1:2007 consists of the English text of the European standard EN 15316-1:2007.</p> <p>This document is endorsed on 14.09.2007 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>
--	---

<p><b>Käsitlusala:</b> This European Standard specifies the structure for calculation of energy use for space heating systems and domestic hot water systems in buildings. It standardises the required inputs and outputs for the calculations, in order to achieve a common European calculation method. The calculation method facilitates the energy analysis of the different sub-systems of the heating system, including control (emission, distribution, storage, generation), through determination of the system energy losses and the system performance factors. This performance analysis permits the comparison between sub-systems and makes it possible to monitor the impact of each sub-system on the energy performance of the building.</p>	<p><b>Scope:</b> This European Standard specifies the structure for calculation of energy use for space heating systems and domestic hot water systems in buildings. It standardises the required inputs and outputs for the calculations, in order to achieve a common European calculation method. The calculation method facilitates the energy analysis of the different sub-systems of the heating system, including control (emission, distribution, storage, generation), through determination of the system energy losses and the system performance factors. This performance analysis permits the comparison between sub-systems and makes it possible to monitor the impact of each sub-system on the energy performance of the building.</p>
---	---

ICS 91.140.10

Võtmesõnad:

ICS 91.140.10

English Version

## Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 1: General

Systèmes de chauffage dans les bâtiments - Méthode de calcul des besoins énergétiques et des rendements des systèmes - Partie 1: Généralités

Heizsysteme in Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Wirkungsgrade von Systemen - Teil 1: Allgemeines

This European Standard was approved by CEN on 21 June 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

**Contents**

Page

Foreword.....3

Introduction .....5

1 Scope .....6

2 Normative references .....6

3 Terms and definitions, symbols and units.....6

3.1 Terms and definitions .....6

3.2 Symbols and units .....13

4 Principle of the method .....14

4.1 System thermal losses of a technical building system for space heating and domestic hot water.....14

4.2 Calculation period.....16

4.3 Operating conditions.....16

4.4 Energy performance indicators of space heating and domestic hot water systems or sub-systems.....16

5 Energy calculation for a space heating and domestic hot water system .....17

5.1 General.....17

5.2 Energy losses from the space heating system .....17

5.3 Energy losses from the domestic hot water system.....18

5.4 Simplified and detailed methods for calculation of the system energy losses .....19

Annex A (informative) Sample of a heat emission sub-system for space heating.....20

Annex B (informative) Sample calculation of a space heating system with electrical domestic hot water system .....21

Annex C (informative) Splitting and/or branching of the heating system .....22

Bibliography .....23

## Foreword

This document (EN 15316-1:2007) has been prepared by Technical Committee CEN/TC 228 "Heating systems in buildings", the secretariat of which is held by DS.

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 January 2008, and conflicting national standards shall be withdrawn at the latest by January 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 calculation of the energy performance of buildings. An overview of the whole set of standards is given in prCEN/TR 15615.

The subjects covered by CEN/TC 228 are the following:

- design of heating systems (water based, electrical etc.);
- installation of heating systems;
- commissioning of heating systems;
- instructions for operation, maintenance and use of heating systems;
- methods for calculation of the design heat loss and heat loads;
- methods for calculation of the energy performance of heating systems.

Heating systems also include the effect of attached systems such as hot water production systems.

All these standards are systems standards, i.e. they are based on requirements addressed to the system as a whole and not dealing with requirements to the products within the system.

Where possible, reference is made to other European or International Standards, a.o. product standards. However, use of products complying with relevant product standards is no guarantee of compliance with the system requirements.

The requirements are mainly expressed as functional requirements, i.e. requirements dealing with the function of the system and not specifying shape, material, dimensions or the like.

The guidelines describe ways to meet the requirements, but other ways to fulfil the functional requirements might be used if fulfilment can be proved.

Heating systems differ among the member countries due to climate, traditions and national regulations. In some cases requirements are given as classes so national or individual needs may be accommodated.

In cases where the standards contradict with national regulations, the latter should be followed.

EN 15316 *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies* consists of the following parts:

*Part 1: General*

*Part 2-1: Space heating emission systems*

*Part 2-3: Space heating distribution systems*

*Part 3-1: Domestic hot water systems, characterisation of needs (tapping requirements)*

*Part 3-2: Domestic hot water systems, distribution*

*Part 3-3: Domestic hot water systems, generation*

*Part 4-1: Space heating generation systems, combustion systems (boilers)*

*Part 4-2: Space heating generation systems, heat pump systems*

*Part 4-3: Heat generation systems, thermal solar systems*

*Part 4-4: Heat generation systems, building-integrated cogeneration systems*

*Part 4-5: Space heating generation systems, the performance and quality of district heating and large volume systems*

*Part 4-6: Heat generation systems, photovoltaic systems*

*Part 4-7: Space heating generation systems, biomass combustion systems*

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 constitutes the general part of a set of standards on calculation method for determining system energy requirements and system efficiencies of space heating systems and domestic hot water systems. Other parts of this set of standards cover specific calculation methods related to the various sub-systems of the heating system.

The calculation method is used for the following applications:

- judging compliance with regulations expressed in terms of energy targets;
- optimisation of the energy performance of a planned building, by applying the method to several possible options;
- displaying a conventional level of energy performance of existing buildings;
- assessing the effect of possible energy conservation measures on an existing building, by calculation of the energy requirements with and without the energy conservation measure implemented;
- predicting future energy resource needs on a national or international scale, by calculation of the energy requirements of several buildings which are representative of the entire building stock.

## 1 Scope

This European Standard specifies the structure for calculation of energy use for space heating systems and domestic hot water systems in buildings. It standardises the required inputs and outputs for the calculations, in order to achieve a common European calculation method.

The calculation method facilitates the energy analysis of the different sub-systems of the heating system, including control (emission, distribution, storage, generation), through determination of the system energy losses and the system performance factors. This performance analysis permits the comparison between sub-systems and makes it possible to monitor the impact of each sub-system on the energy performance of the building.

Calculations of the system energy losses of each sub-system of the heating system are defined in subsequent standards (prEN 15316, parts 2-x, 3-x and 4-x). The system thermal losses, the recoverable system thermal losses and the auxiliary energy of the sub-systems of the heating system are summed up. The system thermal losses of the heating system contribute to the overall energy use in buildings (prEN 15603).

Ventilation systems are not included in this European Standard (e.g. balanced systems with heat recovery), but if the air is preheated or an air heating system is installed, system energy losses of these systems are covered by 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 15316-2-1, *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, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 2-3: Space heating distribution systems*

prEN 15316-3-2, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 3-2: Domestic hot water systems, distribution*

prEN 15603<sup>1)</sup>, *Energy performance of buildings — Overall energy use and definition of energy ratings*

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

EN ISO 13790, *Thermal performance of buildings — Calculation of building energy use for space heating (ISO 13790:2004)*

## 3 Terms and 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.

NOTE This European Standard is the reference for definitions for the whole set of prEN 15316 standards. Therefore not all definitions mentioned hereafter are used in this part.

---

<sup>1)</sup> To be published.