

**Heating systems in buildings - Method
for calculation of system energy
requirements and system efficiencies -
Part 4-4: Heat generation systems,
building-integrated cogeneration
systems**

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of system energy requirements and system
efficiencies - Part 4-4: Heat generation systems,
building-integrated cogeneration systems

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 15316-4-4:2007 sisaldab Euroopa standardi EN 15316-4-4:2007 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 15316-4-4:2007 consists of the English text of the European standard EN 15316-4-4:2007.</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>
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<p>Käsitlusala: This European Standard defines a method for calculation of the energy requirements, electricity production, thermal output and recoverable losses of building-integrated cogeneration units forming part of a heat generation system (space heating and domestic hot water) in a building. Such units are commonly known as micro- or small scale cogeneration, or micro- or small scale CHP. The calculation is based on the performance characteristics of the units, defined in product standards, and on other characteristics required to evaluate the performance of the units as included in the technical building system. The test of building-integrated cogeneration units for heating systems may be worked out in a national annex. As soon as European test methods are available these should be used.</p>	<p>Scope: This European Standard defines a method for calculation of the energy requirements, electricity production, thermal output and recoverable losses of building-integrated cogeneration units forming part of a heat generation system (space heating and domestic hot water) in a building. Such units are commonly known as micro- or small scale cogeneration, or micro- or small scale CHP. The calculation is based on the performance characteristics of the units, defined in product standards, and on other characteristics required to evaluate the performance of the units as included in the technical building system. The test of building-integrated cogeneration units for heating systems may be worked out in a national annex. As soon as European test methods are available these should be used.</p>
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English Version

Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-4: Heat generation systems, building-integrated cogeneration systems

Systèmes de chauffage dans les bâtiments - Méthode de calcul des besoins énergétiques et des rendements des systèmes - Partie 4-4: Systèmes de génération de chaleur, systèmes de co-génération intégrés au bâtiment

Heizsysteme in Gebäuden - Verfahren zur Berechnung der Energieanforderungen und Wirkungsgrade der Anlagen - Teil 4-4: Wärmeerzeugungssysteme, gebäudeintegrierte KWK-Anlagen

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.



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Foreword

This document (EN 15316-4-4:2007) 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 specific part related to building-integrated cogeneration systems, of the set of EN 15316 standards on methods for calculation of system energy requirements and system efficiencies of space heating systems and domestic hot water systems in buildings.

This European Standard specifies the structure for calculation of the system energy losses and the system performance of building-integrated cogeneration systems. 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 heat generation system, by applying the method to several possible options;
- assessing the effect of possible energy conservation measures on an existing heat generation system, by calculating the energy use with and without the energy conservation measure.

The user needs to refer to other European Standards or to national documents for input data and detailed calculation procedures not provided by this European Standard.

1 Scope

This European Standard defines a method for calculation of the energy requirements, electricity production, thermal output and recoverable losses of building-integrated cogeneration units forming part of a heat generation system (space heating and domestic hot water) in a building. Such units are commonly known as micro- or small scale cogeneration, or micro- or small scale CHP.

The calculation is based on the performance characteristics of the units, defined in product standards, and on other characteristics required to evaluate the performance of the units as included in the technical building system.

The test of building-integrated cogeneration units for heating systems may be worked out in a national annex. As soon as European test methods are available these should be used.

NOTE Primary energy savings and CO₂ savings, which can be achieved by cogeneration units compared to separate production of heat and consumption of electricity, are calculated according to prEN 15603. Indications about the savings calculations are given in informative Annex C.

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.

prEN 15603¹⁾, *Energy performance of buildings — Overall energy use, CO₂ emissions and definition of energy ratings*

3 Terms and definitions

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

3.1
annual load profile method
calculation method for an installation where the cogeneration unit is sized to run on different load ranges throughout the year (e.g. the cogeneration unit operates as a boiler substitute and supplies the entire heat demand of the building)

3.2
annual electrical efficiency
total annual electrical output of the cogeneration unit divided by the total annual fuel input

3.3
annual heat efficiency
total annual heat output of the cogeneration unit divided by the total annual fuel input

3.4
auxiliary energy
electrical energy used by technical building systems for heating, cooling, ventilation and/or domestic hot water to support energy transformation to satisfy energy needs

¹⁾ To be published.