This document is a preview generated by EVS

Hoonete küttesüsteemid. Soojuspump-küttesüsteemide projekteerimine

Heating systems in buildings - Design of heat pump heating systems

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 15450:2007 sisaldab Euroopa standardi EN 15450:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 22.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 15450:2007 consists of the English text of the European standard EN 15450:2007. This document is endorsed on 22.11.2007 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 standard specifies design criteria for heating systems in buildings using electrically driven heat pumps alone or in combination with other heat generators. Heat pump systems considered include (see Table 1):- water – water;- water – air;- brine – water;- refrigerant – water (direct expansion systems);- refrigerant – refrigerant;- air – air;- air – water.This standard takes into account the heating requirements of attached systems (e.g. domestic hot water) in the design of heat supply, but does not cover the design of these systems. This standard covers only the aspects dealing with the heat pump, the interface with the heat distribution system and heat emission system (e.g. buffering system), the control of the whole system and the aspects dealing with energy source of the system.	**Scope:** This standard specifies design criteria for heating systems in buildings using electrically driven heat pumps alone or in combination with other heat generators. Heat pump systems considered include (see Table 1):- water – water;- water – air;- brine – water;- refrigerant – water (direct expansion systems);- refrigerant – refrigerant;- air – air;- air – water.This standard takes into account the heating requirements of attached systems (e.g. domestic hot water) in the design of heat supply, but does not cover the design of these systems. This standard covers only the aspects dealing with the heat pump, the interface with the heat distribution system and heat emission system (e.g. buffering system), the control of the whole system and the aspects dealing with energy source of the system.

ICS 27.080

Võtmesõnad:

The document is protected by EVS

Eesti Standardikeskusele kuulub standardite reprodutseerimis- ja levitamisõigus

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15450

October 2007

ICS 27.080

English Version

Heating systems in buildings - Design of heat pump heating systems

Systèmes de chauffage dans les bâtiments - Conception des systèmes de chauffage par pompe à chaleur

Heizungsanlagen in Gebäuden - Planung von Heizungsanlagen mit Wärmepumpen

This European Standard was approved by CEN on 26 August 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.

This document is a preview generated by EVS

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

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

© 2007 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 15450:2007: E

Contents

Page

This document is a preview generated by EVS

This document is a preview generated by EVS

Foreword

This document (EN 15450:2007) 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 April 2008, and conflicting national standards shall be withdrawn at the latest by April 2008.

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.

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.

This document is a preview generated by EVS

Introduction

This standard provides design criteria for heating systems with integrated heat pump systems with respect to:

— heat source;

— electrical supply;

— strategy;

— positioning;

— noise level;

— heat supply;

— sizing.

Energy performance design criteria are dealt with in another document of this technical committee.

This document is a preview generated by EVS

1 Scope

This standard specifies design criteria for heating systems in buildings using electrically driven heat pumps alone or in combination with other heat generators. Heat pump systems considered include (see Table 1):

— water – water;

— water – air;

— brine – water;

— refrigerant – water (direct expansion systems);

— refrigerant – refrigerant;

— air – air;

— air – water.

This standard takes into account the heating requirements of attached systems (e.g. domestic hot water) in the design of heat supply, but does not cover the design of these systems. This standard covers only the aspects dealing with the heat pump, the interface with the heat distribution system and heat emission system (e.g. buffering system), the control of the whole system and the aspects dealing with energy source of the system.

Systems designed primarily for cooling and systems which can operate simultaneously in cooling and heating mode are not within the scope of this standard.

Table 1 — Heat pump systems (within the scope)

source-system (energy extraction)		**sink-system (energy rejection)**	
energy source [a]	**medium** [b]	**medium**	**energy sink** [c]
exhaust air outdoor air	air	air	indoor air
		water	indoor air water
surface water ground water	water	water	indoor air water
		air	indoor air
ground	brine (water)	air	indoor air
		water	indoor air water
	refrigerant	water	indoor air water
		refrigerant	indoor air

[a] Energy source is the location where the energy is extracted.

[b] Medium is the fluid transported in the corresponding distribution system.

[c] Energy sink is the location where the energy is used; this can be the heated space or water in case of domestic hot water production.

This document is a preview generated by EVS

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 378-1, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 1: Basic requirements, definitions, classification and selection criteria*

EN 12828:2003, *Heating systems in buildings – Design for water-based heating systems*

EN 12831, *Heating systems in buildings - Method for calculation of the design heat load*

EN 14336, *Heating systems in buildings – Installation and commissioning of water based heating systems*

EN 14511-1:2004, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling – Part 1: Terms and definitions*

prEN 15316-4-2, *Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-2: Space heating generation systems, heat pump systems*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12828:2003 and the following apply.

3.1.1
coefficient of performance (COP)
ratio of the heating capacity to the effective power input of the unit, expressed in Watt/Watt

[EN 14511-1:2004]

3.1.2
seasonal performance factor (SPF)
ratio of the total annual energy Q_{HP} delivered by the heat pump to the distribution subsystem for space heating and/or other attached systems (e.g. domestic hot water) to the total annual input of electrical energy consumed, including the total annual input of auxiliary energy

NOTE See also Annex C.

3.1.3
balance point temperature
lowest design external air temperature at which the heat pump output capacity and the building heating demand (heat load) are equal

NOTE At lower external air temperatures, a second heat generator is employed to cover the entire or part of the building heating demand.

3.1.4
bivalent-alternative mode
operational mode in which a second heat generator (e.g. gas boiler) completely accounts for the heat demand of the heating system if the external temperature falls below the balance point temperature

This document is a preview generated by EVS