

Water based surface embedded heating and cooling systems - Part 5: Heating and cooling surfaces embedded in floors, ceilings and walls - Determination of the thermal output

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1264-5:2008 sisaldab Euroopa standardi EN 1264-5:2008 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 10.11.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

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This Estonian standard EVS-EN 1264-5:2008 consists of the English text of the European standard EN 1264-5:2008.

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English Version

Water based surface embedded heating and cooling systems -
Part 5: Heating and cooling surfaces embedded in floors,
ceilings and walls - Determination of the thermal output

Systèmes de surfaces chauffantes et rafraîchissantes
hydrauliques intégrées - Partie 5: Surfaces chauffantes et
rafraîchissantes intégrées dans les sols, les plafonds et les
murs - Détermination de l'émission thermique

Raumflächenintegrierte Heiz- und Kühlsysteme mit
Wasserdurchströmung - Teil 5: Heiz- und Kühlflächen in
Fußböden, Decken und Wänden - Bestimmung der
Wärmeleistung und der Kühlleistung

This European Standard was approved by CEN on 13 September 2008.

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.

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Foreword

This document (EN 1264-5:2008) has been prepared by Technical Committee CEN/TC 130 “Space heating appliances without integral heat sources”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by April 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This draft European Standard, *Water based surface embedded heating and cooling systems*, consists of the following parts:

- Part 1: Definitions and symbols
- Part 2: Floor heating: Prove methods for the determination of the thermal output using calculation and test methods
- Part 3: Dimensioning
- Part 4: Installation
- Part 5: Heating and cooling surfaces embedded in floors, ceilings and walls — Determination of the thermal output

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 the United Kingdom.

Introduction

This draft European Standard is based on the realisation that in the field of commercial trade the thermal output of heating and cooling systems represents the basis of rating. In order to be able to evaluate and compare different heating and cooling systems, it is, therefore, necessary to refer to values determined using one single, unambiguously defined method. The basis for doing so are the prove methods for the determination of the thermal output of floor heating systems described in Part 2 of this European Standard. In analogy to the European Standard EN 442-2 (Radiators and convectors — Part 2: Test methods and rating), this prove method provides characteristic partial load curves under defined boundary conditions as well as the characteristic output of the system represented by the standard thermal output together with the associated standard temperature difference between the heating medium and the room temperature.

1 Scope

This European Standard applies to water based heating and cooling systems embedded into the enclosure surfaces of the room to be heated or to be cooled. Part 5 of this standard deals with the recalculation of values determined in Part 2 of this European Standard for the system in question, using it for floor heating applications. The recalculation method described in this part of the standard enables the conversion of the calculation and test results of Part 2 into results for other surface orientations in the room, i.e. for ceiling and wall heating, as well as for the application as cooling surfaces, i.e. for floor, ceiling and wall cooling. It has to be emphasised that the test results of Part 2 of this European Standard are the basis of all calculation. Therefore the use of this prove method is necessary whether or not the system in question is used for heating or cooling application.

This European Standard shall be applied to commercial trade and practical engineering if proved and certifiable values of the thermal output shall be used.

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 1264-1:1997, *Floor heating — Systems and components — Part 1: Definitions and symbols*

EN 1264-2:2008, *Water based surface embedded heating and cooling systems — Part 2: Floor heating: Prove methods for the determination of the thermal output using calculation and test methods*

3 Definitions and symbols

For the purposes of this document, the definitions and symbols given in EN 1264-1:1997 apply.

4 Calculation method

The calculation method [1] is based on the results obtained in EN 1264-2. The method enables the conversion of these results into results for other surfaces in the room (ceiling and wall heating). The method is also applicable for all the cooling surfaces (floor, ceiling, wall cooling). The change in the surface thermal resistance $\Delta R_\alpha = \Delta(1/\alpha)$ influences the temperature field within the system in the same way as a change in the thermal resistance of the surface covering $\Delta R_{\lambda,B}$ [1]. This is based on the assumptions that all other boundary conditions are unchanged and that the dew point is not reached. This leads to the Equation (1).

$$K_H = K_H(\Delta R_\alpha, R_{\lambda,B}) = \frac{K_{H,Floor}}{1 + \frac{\Delta R_\alpha + R_{\lambda,B}}{R_{\lambda,B}^*} \left(\frac{K_{H,Floor}}{K_{H,Floor}^*} - 1 \right)} \quad (1)$$

The gradient of the characteristic curve K_H (Equation (2)) is also referred to as equivalent heat transmission coefficient. The characteristic curve gives the relationship between the specific thermal output q and the temperature difference $\Delta\vartheta$ between the heating medium and the room (heating system) or between the room and the cooling medium (cooling system):

$$q = K_H \cdot \Delta\vartheta \quad (2)$$