
Ploskovni sistemi za ogrevanje in hlajenje z vodo - 5. del: Grelne in hladilne površine, vgrajene v tla, strop ali stene - Določevanje oddaje toplote

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

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

Ta slovenski standard je istoveten z: prEN 1264-5

ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems
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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

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 130.

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If this draft becomes a European Standard, 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (prEN 1264-5:2020) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 1264-5:2008.

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

- *Part 1: Definitions and symbols;*
- *Part 2: Floor heating: Methods for the determination of the thermal output using calculations and experimental tests;*
- *Part 3: Dimensioning;*
- *Part 4: Installation;*
- *Part 5: Determination of the thermal output for wall and ceiling heating and for floor, wall and ceiling cooling.*

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The main changes with respect to the previous edition are listed below:

- a) Modified the title;
- b) Clarified the scope; <https://standards.iteh.ai/catalog/standards/sist/0dc029a1-9d23-4bff-a60a-92ba4585f1f9/ksist-fpren-1264-5-2021>
- c) Improved wording, especially the term “prove method”.

prEN 1264-5:2020 (E)**Introduction**

EN 1264 is based on the realization 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 test methods for the determination of the thermal output of floor heating systems specified in EN 1264-2. In analogy to EN 442-2, *Radiators and convectors — Part 2: Test methods and rating*, this test 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.

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1 Scope

EN 1264 covers surface embedded heating and cooling systems installed in buildings, residential and non-residential (e.g. office, public, commercial and industrial buildings) and focuses on systems installed for the purpose of thermal comfort.

EN 1264 applies to water based heating and cooling systems embedded into the enclosure surfaces of the room to be heated or to be cooled. It also applies as appropriate to the use of other heating media instead of water.

EN 1264 applies to identify standardized product characteristics by calculation and testing the thermal output of heating for technical specifications and certification. For the design, construction and operation of these systems, EN ISO 11855 applies.

The systems covered in EN 1264 are adjoined to the structural base of the enclosure surfaces of the building, mounted directly or with fixing supports. It does not cover ceiling systems mounted in a suspended ceiling with a designed open air gap between the system and the building structure which allows the thermally induced circulation of the air. The thermal output of these systems can be determined according to ISO 18566, EN 14037 and EN 14240.

EN 1264-5 deals with the recalculation of values determined in EN 1264-2 for the system in question. It enables the conversion of the calculation and measurement results of EN 1264-2 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. The test results of EN 1264-2 are the basis of all calculation, whether or not the system in question is used for heating or cooling application.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1264-1:2019, *Water based surface embedded heating and cooling systems - Part 1: Definitions and symbols*

prEN 1264-2:2019, *Water based surface embedded heating and cooling systems — Part 2: Floor heating: Methods for the determination of the thermal output using calculations and experimental tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1264-1:2019 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

prEN 1264-5:2020 (E)

4 Calculation method

The calculation method 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 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 $\Delta R_{\lambda,B}$. This is based on the assumptions that all other boundary conditions are unchanged and that in case of cooling the dew point is not reached. This leads to the Formula (1).

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

The gradient of the characteristic curve K_H (Formula (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):

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

where

$$K_H = K_H(\Delta R_\alpha, R_{\lambda,B})$$

is the gradient of the characteristic curve, see Formula (2), of the heating/cooling system which shall be calculated, with the actual thermal resistance of the covering $R_{\lambda,B} \geq 0$ and the respective value ΔR_α (see Table A.1);

$$K_{H, \text{Floor}} = K_{H, \text{Floor}}(R_{\lambda,B} = 0)$$

is the gradient of the characteristic curve of the same system with the thermal resistance of the covering $R_{\lambda,B} = 0$ obtained from prEN 1264-2;

$$K_{H, \text{Floor}}^* = K_{H, \text{Floor}}^*(R_{\lambda,B}^*)$$

is the gradient of the characteristic curve of the same system with a higher thermal resistance of the covering $R_{\lambda,B}^* > R_{\lambda,B}$, obtained from EN 1264-2. In this document, generally $R_{\lambda,B}^* = 0,15 \text{ m}^2 \cdot \text{K/W}$ applies;

$$\Delta R_\alpha$$

is the additional thermal transfer resistance to be calculated for the surface in question, see Formula (3) and Table A.1.

$$\Delta R_\alpha = \frac{1}{\alpha} - \frac{1}{10,8 \text{ m}^2 \cdot \text{K/W}} \quad (3)$$

In the case of wall heating and cooling systems, the results of the calculation method described above stringently are valid only for heating or cooling surfaces which fully cover the respective wall. But the accuracy is also sufficient for cases where the wall is partially covered.

5 Test report

For floor heating systems EN 1264-2 applies.

For a given construction the results shall be documented for each scheduled pipe spacing T and each scheduled thickness s_{TJ} above the pipe. The testing body presents the calculation results in a test report. The following equations and the standard values (see below) represent the results.

$$q_H = f(\Delta\vartheta_H, R_{\lambda,B}) \quad (1)$$

$$q_C = f(\Delta\vartheta_C, R_{\lambda,B}) \quad (2)$$

where

q_H is the specific thermal output of the heating surface;

$\Delta\vartheta_H$ is the temperature difference between the average medium temperature and the room;

q_C is the specific thermal output of the cooling surface;

$\Delta\vartheta_C$ is the temperature difference between the room and the average medium temperature.

The Formula (4) and/or Formula (5) are shown in a field of characteristic curves with linear coordinates, see Figure A.1 and Figure A.2. The characteristic curves are drawn for values of the thermal resistance $R_{\lambda,B} = 0$, $R_{\lambda,B} = 0,05$, $R_{\lambda,B} = 0,10$ and $R_{\lambda,B} = 0,15 \text{ m}^2 \cdot \text{K}/\text{W}$. Values of $R_{\lambda,B} > 0,15 \text{ m}^2 \cdot \text{K}/\text{W}$ are not in accordance with this document.

The values of standard specific thermal output $q_{H,N}$ and $q_{C,N}$ are calculated with Formula (2). For heating systems a standard temperature difference

$$\Delta\vartheta_{H,N} = 10 \text{ K},$$

for cooling systems a standard temperature difference

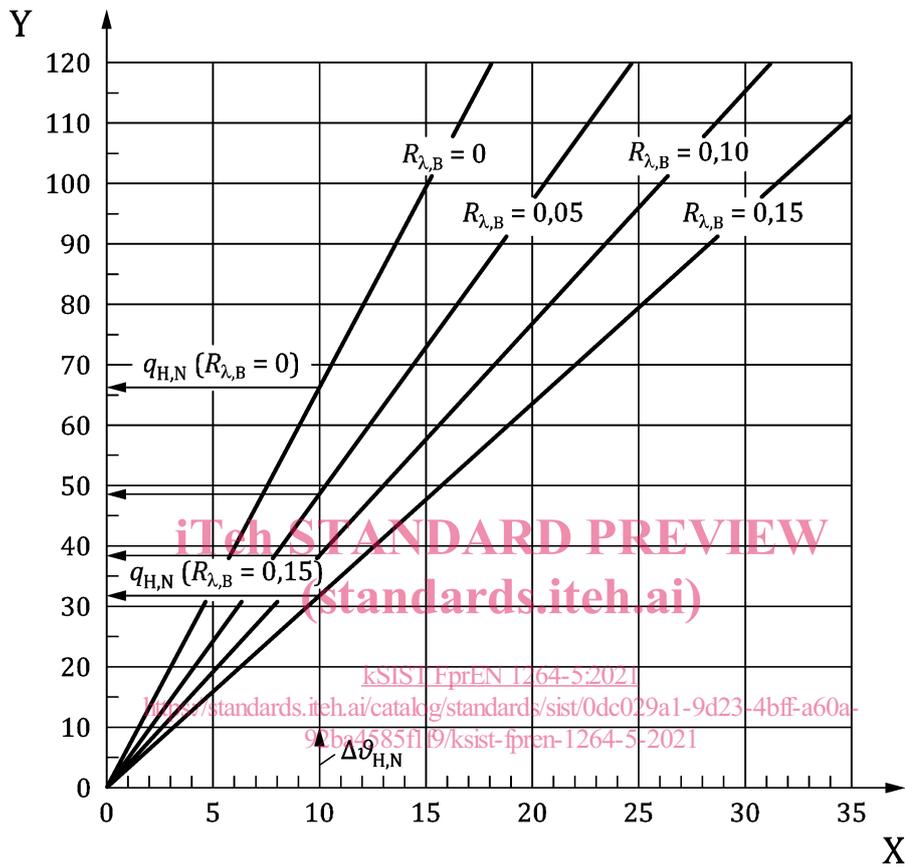
$$\Delta\vartheta_{C,N} = 8 \text{ K}$$

applies. A graphic description is given in Figure A.1 and Figure A.2.

The tested system shall be identified by a construction drawing and a technical description in accordance with prEN 1264-2:2020, Clause 5. These documents shall contain all dimensions and materials which influence the thermal properties. The results are valid only for the tested system. If any change is made to the system, which affects the principles of the thermal testing, a new test shall be carried out.

Annex A (normative)

Figures and tables



Key

Y Specific thermal output $q_{H,N}$ W/m^2

X Temperature difference between heating medium and room $\Delta\theta_{H,N}$ K

Figure A.1 — Field of characteristic curves of a heating system