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ILNAS-EN 1264-2:2021

Water based surface embedded heating and cooling systems - Part 2: Floor heating: Methods for the determination of the thermal output

Raumflächenintegrierte Heiz- und
Kühlsysteme mit Wasserdurchströmung -
Teil 2: Fußbodenheizung: Prüfverfahren
für die Bestimmung der Wärmeleistung

Systèmes de surfaces chauffantes et
rafraîchissantes hydrauliques intégrées -
Partie 2: Chauffage par le sol: Méthodes
de démonstration pour la détermination

05/2021



National Foreword

This European Standard EN 1264-2:2021 was adopted as Luxembourgish Standard ILNAS-EN 1264-2:2021.

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English Version

**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**

Systèmes de surfaces chauffantes et rafraîchissantes
hydrauliques intégrées - Partie 2: Chauffage par le sol:
Méthodes de démonstration pour la détermination de
l'émission thermique utilisant des méthodes par le
calcul et à l'aide de méthodes d'essai

Raumflächenintegrierte Heiz- und Kühlsysteme mit
Wasserdurchströmung - Teil 2: Fußbodenheizung:
Prüfverfahren für die Bestimmung der Wärmeleistung
unter Benutzung von Berechnungsmethoden und
experimentellen Methoden

This European Standard was approved by CEN on 12 April 2021.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 1264-2:2021) 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 November 2021 and conflicting national standards shall be withdrawn at the latest by November 2021.

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

This document supersedes EN 1264-2:2008+A1:2012.

The main changes compared to the previous edition are listed below:

- a) Modification of the Title;
- b) Clarification of the Scope;
- c) Improved wording, especially the term “prove method”;
- d) Modification of Clause 9;
- e) Deletion of Clause 10, Test procedure for the determination of the effective thermal resistance of carpets and all references to this Clause;
- f) Deletion of Figures A.9, A.10 and A.11;
- g) Table A.13, Heat conductivities for materials was moved to the new Annex C and was modified;
- h) Deletion of Annex B, Test procedure for the determination of parameters for application in the EN 15377 series;
- i) Addition of new Clause 12, Calculation of the specific heat capacity of the system (C-Value).

EN 1264, *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.*

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The EN 1264 series 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/or cooling systems, it is therefore necessary to refer to values determined using one single, unambiguously defined method. The basis for doing so is 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*, these test methods provide 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

The EN 1264 series gives guidelines for 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.

The EN 1264 series gives guidelines for water based heating and cooling systems embedded into the enclosure surfaces of the room to be heated or to be cooled. It also specifies the use of other heating media instead of water, as appropriate.

The EN 1264 series specifies 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, see EN 1264-3 and EN 1264-4 for the types A, B, C, D, H, I and J. For the types E, F and G, see the EN ISO 11855 series.

The systems specified in the EN 1264 series are adjoined to the structural base of the enclosure surfaces of the building, mounted directly or with fixing supports. The EN 1264 series does not specify 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 the EN 14037 series and EN 14240.

EN 1264-2 specifies hot water floor heating systems. The application of EN 1264-5 requires the prior use of EN 1264-2. EN 1264-5 specifies the conversion of the thermal output of floor heating systems determined in EN 1264-2 into the thermal output of heating surfaces embedded in walls and ceilings as well as into the thermal output of cooling surfaces embedded in floors, walls and ceilings.

EN 1264-2 specifies the boundary conditions and the test methods for the determination of the thermal output of hot water floor heating systems as a function of the temperature difference between the heating medium and the room temperature.

The thermal output is tested by a calculation method and by a measurement method. The calculation method is applicable to systems corresponding to the definitions in EN 1264-1 (type A, B, C, D, H, I and J). The measurement method gives guidance for systems not corresponding to these definitions. The calculation method and the measurement method are consistent with each other and provide correlating and adequate test results.

The test results, expressed depending on further parameters, are the standard specific thermal output and the associated standard temperature difference between the heating medium and the room temperature as well as fields of characteristic curves showing the relationship between the specific thermal output and the temperature difference between the heating medium and the room.

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, *Water based surface embedded heating and cooling systems — Part 1: Definitions and symbols*

EN 1264-3:2021, *Water based surface embedded heating and cooling systems — Part 3: Dimensioning*

3 Terms and definitions

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

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

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

4 Thermal boundary conditions

A floor heating surface with a given average surface temperature exchanges the same thermal output in any room with the same indoor room temperature (standard indoor room temperature ϑ_i). It is therefore possible to give a basic characteristic curve of the relationship between specific thermal output and average surface temperature that is independent of the heating system and applicable to all floor heating surfaces (including those having peripheral areas with greater heat emissions) (see Figure A.1 in normative Annex A).

In contrast, every floor heating system has its own maximum permissible specific thermal output, the limit specific thermal output, q_G . This output is calculated for an ambient (standard) indoor room temperature $\vartheta_i = 20\text{ °C}$. The other condition is the maximum surface temperature $\vartheta_{F,max} = 29\text{ °C}^1$ at temperature drop between supply and return of the heating medium $\sigma = 0\text{ K}$. The maximum specific thermal output for the peripheral area will be achieved at a maximum surface temperature $\vartheta_{F,max} = 35\text{ °C}^2$ and $\sigma = 0\text{ K}$.

For the calculation and for the test procedure, the centre of the heating surface is used as the reference point for $\vartheta_{F,max}$, regardless of system type.

The average surface temperature $\vartheta_{F,m}$, determining the specific thermal output (see basic characteristic curve) is linked with the maximum surface temperature. In this context, $\vartheta_{F,m} < \vartheta_{F,max}$ always applies.

The achievable value $\vartheta_{F,m}$ depends on both the floor heating system and the operating conditions (temperature drop $\sigma = \vartheta_V - \vartheta_R$, downward thermal output q_u and thermal resistance of the floor covering $R_{\lambda,B}$).

¹ National regulations can limit this temperature to a lower value.

² Some floor covering materials can require lower temperatures.