



SLOVENSKI STANDARD SIST EN 1264-1:2021

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SIST EN 1264-1:2011

Ploskovni sistemi za ogrevanje in hlajenje z vodo - 1. del: Definicije in simboli

Water based surface embedded heating and cooling systems - Part 1: Definitions and symbols

Raumflächenintegrierte Heiz- und Kühlsysteme mit Wasserdurchströmung - Teil 1: Definitionen und Symbole

Systèmes de surfaces chauffantes et rafraîchissantes hydrauliques intégrées - Partie 1: Définitions et symboles

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ICS:

01.040.91	Gradbeni materiali in gradnja (Slovarji)	Construction materials and building (Vocabularies)
01.075	Simboli za znake	Character symbols
91.140.10	Sistemi centralnega ogrevanja	Central heating systems

SIST EN 1264-1:2021

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EUROPEAN STANDARD

EN 1264-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 01.040.91; 01.075; 91.140.10

Supersedes EN 1264-1:2011

English Version

Water based surface embedded heating and cooling systems - Part 1: Definitions and symbols

Systèmes de surfaces chauffantes et rafraîchissantes
hydrauliques intégrées - Partie 1: Définitions et
symboles

Raumflächenintegrierte Heiz- und Kühlsysteme mit
Wasserdurchströmung - Teil 1: Definitionen und
Symbole

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.

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

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European foreword

This document (EN 1264-1:2021) 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 1264-1:2011.

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

- a) Clarification of Scope;
- b) Improved wording;
- c) Specification of the definition of embedded heating and cooling systems;
- d) Expansion of the types of embedded heating and cooling systems;
- e) Deletion, modification and addition of several terms and definitions;
- f) Updated references.

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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.

EN 1264-1:2021 (E)

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 1264-1 specifies system types and characteristics of water based surface embedded radiant heating and cooling systems.

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 1264-2:2021, *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*

EN 1264-4:2021, *Water based surface embedded heating and cooling systems — Part 4: Installation*

EN 1264-5:2021, *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*

EN ISO 11855 (all parts), *Building environment design — Design, dimensioning, installation and control of embedded radiant heating and cooling systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/>

3.1 System description

For the definition of the different system types, see Annex A.

3.1.1

surface embedded heating and cooling system

heating or cooling installation embedded into the enclosure surfaces of the room which is adjoined to the structural base of the enclosure surfaces of the building, directly mounted or with fixing supports, without any open air gap consisting of circuits of pipes, circuit distributors, control equipment and thermal diffusion layers

Note 1 to entry: The system can be embedded in the floor, wall or ceiling.

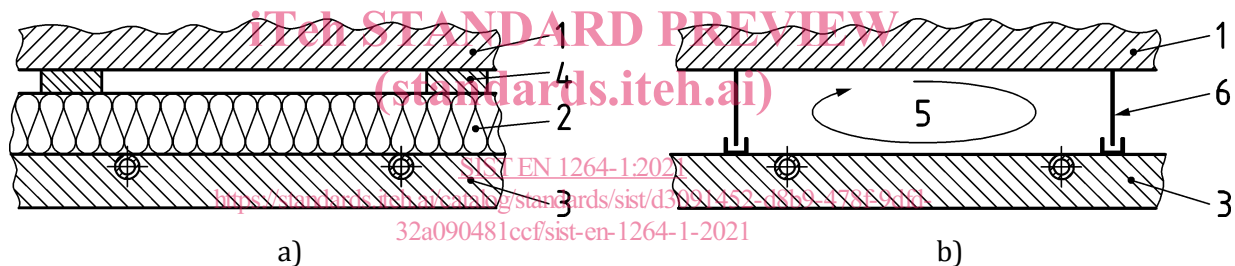
3.1.2

open air gap

designed air inclusions between the heated or cooled surface and the structural base of the building which is large enough to enable thermally induced air circulation

Note 1 to entry: The designed open air gap supports the thermal exchange between the system and the room.

Note 2 to entry: Wall and ceiling systems can have air inclusions due to fixing supports, see Figure 1 a). These are not regarded as open air gaps. These separated inclusions act as a thermal insulation without internal air circulation.



Key

- 1 structural base
- 2 insulation layer
- 3 heating/cooling panel
- 4 fixing supports
- 5 open air gap
- 6 suspension

Figure 1 — Example of a ceiling system without (a) and with (b) an open air gap

3.1.3

circuit

section of pipes connected to circuit distributor which can be independently switched and controlled

3.1.4

circuit distributor

common connection point for several circuits

EN 1264-1:2021 (E)**3.1.5****thermal diffusion device**

component in contact with the pipe having a high thermal conductivity in order to improve the thermal distribution

3.1.6**thermal diffusion layer**

layer for transferring the thermal energy between the pipes and the surface and storing thermal energy

3.1.7**system insulation**

insulation with the thermal resistance $R_{\lambda,ins}$ to limit the heat loss of heating and cooling systems

Note 1 to entry: According to EN 1264-4:2021, Table 1 and Table 3.

3.1.8**supplementary heating equipment**

additional heating facility, e.g. convectors, radiators with the additional required thermal output and possibly with its own control equipment

3.1.9**emission system**

part of the embedded heating and cooling system that carries out the thermal transfer in the room

Note 1 to entry: The thermal transfer can be positive (heating case) or negative (cooling case).

EXAMPLE Embedded radiant heating and cooling system.

3.2 Parameters of design**3.2.1****standard heat load in a floor heated room**

$Q_{N,f}$

rate of heat loss from the building to the outside and to neighbouring rooms under standardized conditions, depending on the regional climatic data, the location, its use and the thermal properties of the building

Note 1 to entry: When calculating the standard heat load, the thermal output from the embedded heating systems in the neighbouring room is not taken into account.

3.2.2**standard cooling load**

$Q_{C,f}$

rate of heat input into the building from the external environment and neighbouring rooms under standardized conditions and depending on the regional climatic data, location, its use and thermal properties of the building

3.2.3**additional thermal output**

Q_{out}

thermal output of supplementary heating equipment

Note 1 to entry: $Q_{out} = Q_{N,f} - Q_F$

3.2.4**heating/cooling surface** A_F

surface area covered by the heating or cooling system, including a perimeter strip

Note 1 to entry: The width of the perimeter strip is generally half of one pipe spacing, but not exceeding 0,15 m.

3.2.5**furniture area**

floor surface area not covered by a heating or cooling system, intended for permanent placement of furnishings forming part of the building

3.2.6**peripheral area** A_R

floor surface heated to a higher temperature and generally an area of 1,0 m maximum in width along exterior walls

Note 1 to entry: It is not an occupied area.

3.2.7**occupied area** A_A

area within the heated or cooled floor surface occupied for long periods

Note 1 to entry: In case of floor heating, it consists of the heating floor surface less the peripheral area.

3.2.8**standard indoor room temperature** ϑ_i

resultant indoor temperature defined as the average of the dry air temperature and the mean radiant temperature

Note 1 to entry: The resultant temperature is considered as the relevant for thermal comfort assessment and heat loss calculations. This internal temperature ϑ_i is used for the calculation method [5], [6].

3.2.9**regional dew point** $\vartheta_{Dp,R}$

dew point specified depending on the climatic conditions of the region

3.2.10**design dew point** $\vartheta_{Dp,des}$

dew point determined for the design

3.3 Thermal output**3.3.1****specific thermal output of floor heating systems** q

thermal output of floor heating systems divided by the surface area

EN 1264-1:2021 (E)**3.3.2****specific thermal output of embedded heating systems** q_H

thermal output of embedded heating systems divided by the surface area

3.3.3**specific thermal output of embedded cooling systems** q_C

thermal output of embedded cooling systems divided by the surface area

3.3.4**limit of specific thermal output of floor heating systems** q_G

specific thermal output at which the permissible maximum floor surface temperature is achieved

Note 1 to entry: In the case of floor heating, this q_G means the maximum surface temperature $\vartheta_{F,max}$ within the range of temperature distribution.

3.3.5**maximum limit of specific thermal output of floor heating systems** $q_{G,max}$

limit of specific thermal output of floor heating systems, calculated in accordance with the Basic Characteristic Curve due to maximum floor surface temperature $\vartheta_{F,max}$ together with isothermal surface temperature distribution

3.3.6**standard thermal output of floor heating systems** q_N

limit of specific thermal output of floor heating systems achieved without floor covering

3.3.7**standard specific thermal output of embedded heating systems** $q_{H,N}$

specific thermal output of embedded heating systems achieved with standard temperature difference between heating medium and room

Note 1 to entry: For heating systems (other than floor heating), $\Delta\vartheta_{H,N} = 10$ K is valid.

3.3.8**standard specific thermal output of embedded cooling systems** $q_{C,N}$

specific thermal output of embedded cooling systems achieved with standard temperature difference between room and cooling medium

Note 1 to entry: For cooling systems, $\Delta\vartheta_{C,N} = 8$ K is valid.

3.3.9**design specific thermal output of floor heating systems** q_{des}

amount due to the room, calculated with the standard heat load, divided by the heating floor surface area

3.3.10**maximum specific thermal output** q_{\max}

highest q_{des} within q_G of specific thermal output in circuits operated at the same design flow temperature

3.3.11**downward specific heat loss of floor heating systems** q_u

specific thermal output throughout the floor construction, to rooms below, the ground or unheated spaces

3.3.12**design thermal output of floor heating systems** Q_F

sum of thermal output based on output of each area in relation to the total room floor area

3.3.13**design specific cooling load** $q_{C,Ld,des}$

standard cooling load divided by the cooling surface

3.3.14**design specific thermal output of cooling systems** $q_{C,des}$

specific thermal output achieved with design average temperature difference between room and cooling medium

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3.4 Surface temperatures**3.4.1****maximum floor surface temperature** $\vartheta_{F,\max}$

maximum temperature permissible for physiological reasons, for calculation of the limit curves, which may occur at a point on the floor in the occupied or peripheral area

Note 1 to entry: $\vartheta_{F,\max}$ limits the thermal output. In this case the highest point surface temperature on the floor need to be taken.

3.4.2**average surface temperature** $\vartheta_{F,m}$

average temperature of the activated surface area for each circuit

3.4.3**average temperature difference between surface and room**

difference $\vartheta_{F,m} - \vartheta_i$ between the average temperature of the heating or cooling surface and the standard indoor room temperature

Note 1 to entry: This determines the specific thermal output for heating and cooling.

EN 1264-1:2021 (E)

3.5 Temperatures of the heating/cooling medium

In this standard series, the denotations medium and water are used as synonym.

3.5.1 temperature difference between heating medium and room
 $\Delta\vartheta_H$

average difference between the temperatures of the heating medium and the standard indoor room temperature determined in a logarithmic equation

Note 1 to entry: See EN 1264-2:2021, Formula (1).

3.5.2 limit temperature difference between heating medium and room
 $\Delta\vartheta_{H,G}$

temperature difference between heating medium and room at which the permissible maximum floor surface temperature is achieved

Note 1 to entry: $\Delta\vartheta_{H,G}$ is determined by the specific thermal output q_G , see EN 1264-2:2021, Formula (21).

3.5.3 standard temperature difference between heating medium and room for floor heating systems
 $\Delta\vartheta_N$

limit temperature difference $\Delta\vartheta_{H,G}$ between heating medium and room for floor heating systems without floor covering

Note 1 to entry: $\Delta\vartheta_N$ is determined by the standard specific thermal output q_N .

[SIST EN 1264-1:2021](https://standards.iteh.ai/catalog/standards/sist/d3091452-d8b9-478f-9dfd-32a090481ccf/sist-en-1264-1-2021)

3.5.4 standard temperature difference between heating medium and room for heating systems with the exception of floor heating
 $\Delta\vartheta_{H,N}$

standard value set at 10 K

3.5.5 design temperature difference between heating medium and room of floor heating systems
 $\Delta\vartheta_{H,des}$

temperature difference between heating medium and room taking into account the thermal resistance of the chosen floor covering, at q_{max}

3.5.6 heating circuit design temperature difference between heating medium and room of floor heating systems
 $\Delta\vartheta_{H,j}$

temperature difference between heating medium and room with the thermal resistance of the chosen floor covering, at a required specific thermal output q_j which is less than the maximum specific thermal output q_{max}