SLOVENSKI STANDARD
SIST EN ISO 11855-1:2021/oprA1:2023

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Načrtovanje notranjega okolja v stavbah - Vgrajeni sevalni ogrevalni in hladilni sistemi - 1. del: Definicije, simboli in merila za ugodje - Dopolnilo A1 (ISO 11855-1:2021/DAM 1:2022)

Building environment design - Embedded radiant heating and cooling systems - Part 1: Definitions, symbols, and comfort criteria - Amendment 1 (ISO 11855-1:2021/DAM 1:2022)

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Conception de l'environnement des bâtiments - Systèmes intégrés de chauffage et de refroidissement par rayonnement - Partie 1: Définitions, symboles et critères de confort - Amendement 1 (ISO 11855-1:2021/DAM 1:2022)

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ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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Building environment design — Embedded radiant heating and cooling systems —

Part 1: Definitions, symbols, and comfort criteria

AMENDMENT 1

Conception de l'environnement des bâtiments — Systèmes intégrés de chauffage et de refroidissement par rayonnement —

Partie 1: Définitions, symboles et critères de confort

AMENDEMENT 1

ICS: 91.040.01

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Building environment design — Embedded radiant heating and cooling systems —

Part 1: Definitions, symbols, and comfort criteria

AMENDMENT 1

Foreword

Modify to the following:

The main changes compared to the previous edition are as follows:

— only references cited normatively were kept in Clause 2, the others were moved to Bibliography;

— in Clause 3, self-explanatory terms were removed, two similar terms representing the same concept were unified into one term, and one term explaining two concepts were divided into two terms each having one concept;

— editorial changes were performed.

— radiant systems are newly classified into types according to the differences in the calculation method to determine the thermal output of the system.

4 Symbols and abbreviated terms

Modify the rows in Table 1 as follows:

S	m	Thickness of the screed (excluding the pipes in the system type I)
s_h	m	In the system type II, thickness of thermal insulation from the outward edge of the insulation to the inward edge of the pipes (see Figure 1)
s_{ins}	m	Thickness of thermal insulation
s_l	m	In the system type II, thickness of thermal insulation from the outward edge of the insulation to the outward edge of the pipes (see Figure 1)

5 Comfort criteria

5.5.3 Vertical air temperature difference

Figure 1 — Local thermal discomfort caused by vertical air temperature difference

Modify Figure 1 key as follows:

Key

X vertical air temperature difference between head and feet, K

Y percentage dissatisfied, %

Modify to add new Section 6 Classification of radiant system types as follows:

6 Classification of radiant system types

6.1 General

Radiant systems are classified into types according to the differences in the calculation method to determine the thermal output of the system. The configuration of each system type was explained by the main elements and layers constituting the system.

A radiant system types are composed of a combination of some, or all of the following main elements and layers.

Ag: air gap

Ct: capillary tubes

In: thermal insulation layer Pe: Pipes or electric cables Pt: protection layer

Sc: structural construction

Sf: surface layer

St: structural layer

Su: surface layer

Tc: thermal conduction layer Td: thermal diffusion layer Tr: thermal reflection layer

Thermal diffusion layer also has a function of weight distribution in floor application. Depending on whether the radiant system is heating or cooling, a heated or a cooled thermal medium is supplied through pipes. The pipes shown in the classifications will be electric cables for electrical heating systems.

The thermal output of a radiant system can be obtained from the thermal output calculation methods according to radiant system types described in ISO 11855-2. For radiant systems that do not belong to the radiant system type classification, thermal output can be obtained by measurement or detailed calculation methods by finite difference or finite element method.

In the description of each radiant system type, the main characteristics of the system type, the variant radiant systems belong to this type, thermal medium and installation method, methods for determining the thermal output, application, and previous system types that belong to this type were included.

By clearly defining the radiant system types in the standard, the readers will be capable of achieving their purposes in design, dimensioning, installation, and control of the system.

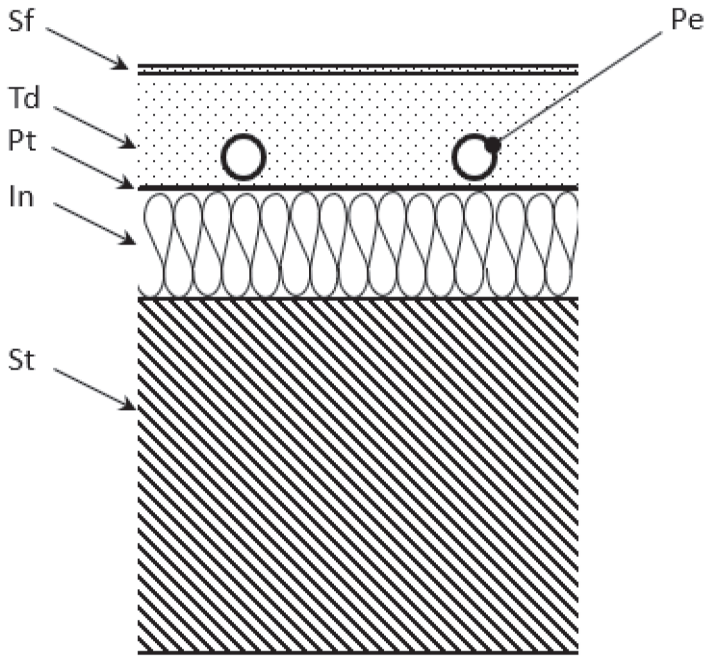
6.2 Radiant system type I, pipes directly included in a thermal diffusion layer

The system is a classic wet or dry system where the pipes enclosed by screed. Above the screed can be arranged different floor coverings. The main feature of the construction is that the pipes are completely embedded in a support layer. The system can be constructed with and without insulation layer.

For the determination of thermal output, a calculation method will be used if boundary conditions are full filled. If boundary conditions are not provided, a measurement method should be applied.

The system can be used as heating and cooling systems, installed in floors, walls, and ceilings.

In the previous classification, Type-A, C, H, J and I are types to belong to this category.



Key

In	thermal insulation layer
Pe	pipes or electric cables
Pt	protection layer
Sf	surface layer
St	structural layer
Td	thermal diffusion layer

Figure 2 — Radiant system Type I, pipes directly included in a thermal diffusion layer

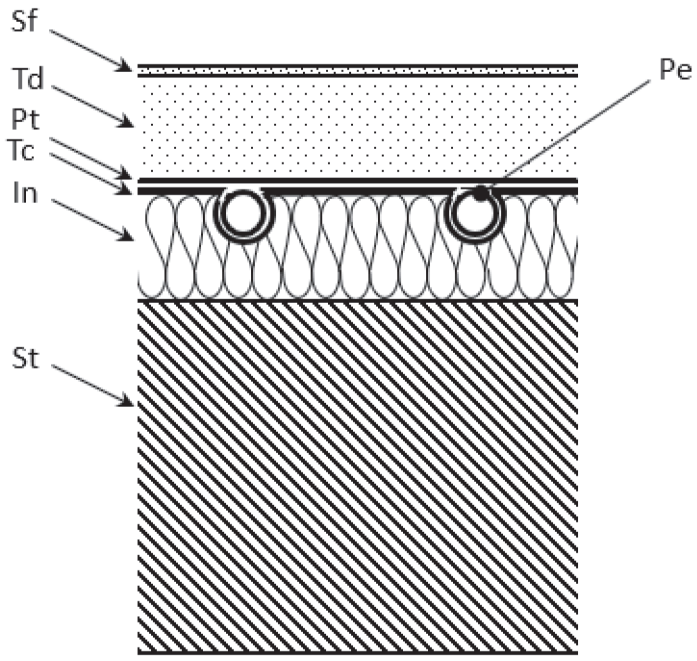
6.3 Radiant system type II, pipes included in a thermal insulation layer with additional thermal conduction layer

The system is a classic dry system where the pipes are enclosed in a sheet metal. There must be partial surface contact between the pipe and the thermal conduction layer. The sheet metal may cover the whole surface of the insulation layer or just parts of it. The system is designed as a dry system. Significate is the heat distribution layer between the pipes, which can be continuous and interrupted.

For the determination of thermal output, a calculation method will be used if boundary conditions are full filled. If boundary conditions are not provided, measurement method should be applied.

The system can be used as heating and cooling systems, installed in floors, walls, and ceilings.

In the previous classification, Type-B is a type to belong to this category.



Key

In	thermal insulation layer
Pe	pipes or electric cables
Pt	protection layer
Sf	surface layer
St	structural layer
Tc	thermal conduction layer
Td	thermal diffusion layer

Figure 3 — Radiant system Type II, pipes included in a thermal insulation layer with additional thermal conduction layer

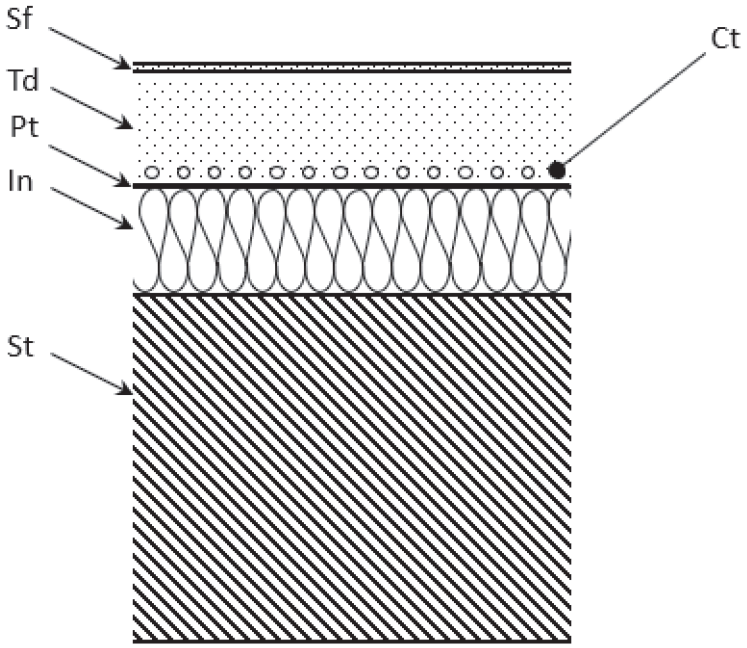
6.4 Radiant system type III, capillary tubes directly included in a thermal diffusion layer

The system is a wet system in which the capillary tubes are completely enclosed. Compared to system I, a very small pipe spacing is realized. The system is designed as a wet and dry system. In the wet system, the pipes are integrated in a carrier layer. In the dry system, the pipes are integrated in a plate. The system also covers constructions like type I but with capillary tubes (capillary tubes located in the middle of the thermal diffusion layer).

For the determination of thermal output, a calculation method will be used if boundary conditions are full filled. If boundary conditions are not provided, measurement method should be applied.

The system can be used as heating and cooling systems, installed in floors, walls, and ceilings.

In the previous classification, Type-F is a type to belong to this category.



Key

Ct	capillary tubes
In	thermal insulation layer
Pt	protection layer
Sf	surface layer
St	structural layer
Td	thermal diffusion layer

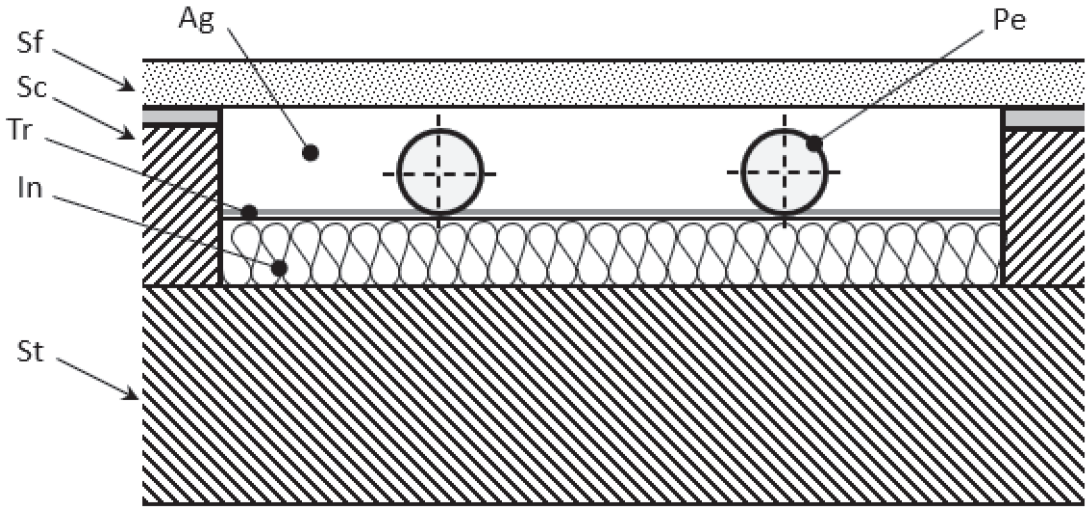
Figure 4 — Radiant system Type III, capillary tubes directly included in a thermal diffusion layer

6.5 Radiant system type IV, pipes with a thermal reflection layer and an air gap to floor covering

The system is a dry system where the pipes are on the thermal insulation connected to a heat diffusion device. The pipes are in a closed space. Between the pipes and the floor covering is an air gap. The system is designed as a wet and dry system. In the wet system, the pipes are integrated in a carrier system. In the dry system, the pipes are integrated in a plate.

For the determination of thermal output, a measurement method should be applied.

The system can be used as heating and cooling systems. The typical application space of this system is sports hall. In the previous classification, Type-G is a type to belong to this category.



Key

Ag air gap
In thermal insulation layer
Pe pipes or electric cables
Sc structural construction
Sf surface layer (floor covering)
St structural layer
Tr thermal reflection layer

Figure 5 — Radiant system Type IV, pipes with a thermal reflection layer and an air gap to floor covering

6.6 Radiant system type V, pipes included directly in the structural construction (TABS)

The system is characterized by direct integration into the building structure. There is no thermal conduction layer. The pipes are integrated in the structural construction. The heat flow is introduced into the building structure via pipes (hydraulic system).

For the determination of thermal output, a calculation method should be applied.

The system can be used as heating and cooling systems, installed in floors, walls, and ceilings. The typical application space of this system is office buildings. If the system is used in external wall, a thermal insulation layer is necessary. If the system is installed in an internal wall / ceiling / floor, the heat flux is transferred in both direction (to the room and to the connected room). In the previous classification, Type-E is a type to belong to this category.