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Building environment design — Design, dimensioning, installation and control of embedded radiant heating and cooling systems —

Part 8: Electrical heating systems

Conception de l'environnement des bâtiments — Conception, dimensionnement, installation et contrôle des systèmes intégrés de chauffage et de refroidissement par rayonnement —

Partie 8: Systèmes de chauffage électrique

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Foreword

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This document was prepared by Technical Committee ISO/TC 205, *Building environment design*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 228, *Heating systems and water based cooling systems in buildings,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Introduction

The radiant heating and cooling system consists of heat emitting/absorbing, heat supply, distribution, and control systems. The ISO 11855 series deals with the embedded surface heating and cooling system that directly controls heat exchange within the space. It does not include the system equipment itself, such as heat source, distribution system and controller.

The ISO 11855 series addresses an embedded system that is integrated with the building structure. Therefore, the panel system with open air gap, which is not integrated with the building structure, is not covered by this series.

The ISO 11855 series can be applied to systems that use not only water but also other liquids or electricity as a heating or cooling medium.

The object of the ISO 11855 series is to provide criteria to effectively design embedded systems. To do this, it presents comfort criteria for the space served by embedded systems, heat output calculation, dimensioning, dynamic analysis, installation, operation, and control method of embedded systems.

The following is a summary of the ISO 11855 parts:

— ISO 11855-1 specifies the comfort criteria which should be considered in designing embedded radiant heating and cooling systems, since the main objective of the radiant heating and cooling system is to satisfy thermal comfort of the occupants.

— ISO 11855-2 provides steady-state calculation methods for determination of the heating and cooling capacity.

— ISO 11855-3 specifies design and dimensioning methods of radiant heating and cooling systems to ensure the heating and cooling capacity.

— ISO 11855-4 provides a dimensioning and calculation method to design Thermo Active Building Systems (TABS) for energy-saving purposes, since radiant heating and cooling systems can reduce energy consumption and heat source size by using renewable energy.

— ISO 11855-5 addresses the installation process for the system to operate as intended.

— ISO 11855-6 shows a proper control method of the radiant heating and cooling systems to ensure the maximum performance which was intended in the design stage when the system is actually being operated in a building.

— ISO 11855-7 presents a calculation method for the product specific input parameters for ISO 52031.

— ISO 11855-8 (this document) presents a calculation method for electrical heating systems.

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Building environment design — Design, dimensioning, installation and control of embedded radiant heating and cooling systems —

Part 8: Electrical heating systems

1 Scope

This document specifies procedures and conditions to enable the heat flux in electrical surface heating systems to be determined relative to the medium differential temperature for systems. The determination of thermal performance electrical surface heating systems and their conformity to this document is carried out by calculation in accordance with design documents and a model. This enables a uniform assessment and calculation surface heating systems.

The surface temperature and the temperature uniformity of the heated surface, nominal heat flux density between electrical heated layer and space are given as the result.

The ISO 11855 series is applicable to water based embedded surface heating and cooling systems in residential, commercial and industrial buildings[1)]. The methods apply to systems integrated into the wall, floor or ceiling construction without any open-air gaps. It does not apply to ceiling mounted panel systems with open air gaps which are not integrated into the building structure.

The ISO 11855 series also applies, as appropriate, to the use of fluids other than water as a heating or cooling medium. The ISO 11855 series is not applicable for testing of systems. The methods do not apply to heated or chilled ceiling panels or beams.

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.

ISO 52000-1, *Energy performance of buildings — Overarching EPB assessment Part 1: general framework and procedure*

ISO 11855-1, *Building environment design — Embedded radiant heating and cooling systems — Part 1: Definitions, symbols, and comfort criteria*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11855-1 apply.

ISO and IEC maintain terminology 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/

1) ISO 11855-7 can also be used for electrical heated embedded systems.

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