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Building environment design — Design, test methods and control of hydronic radiant heating and cooling panel systems —

Part 3: Design of ceiling mounted radiant panels

Conception de l'environnement des bâtiments — Conception, méthodes d'essai et contrôle des systèmes de panneaux hydroniques radiants de chauffage et de refroidissement —

Partie 3: Conception des panneaux radiants montés au plafond

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 205, *Building environment design*.

A list of all parts in the ISO 18566 series can be found on the ISO website.

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Introduction

There are various types of hydronic radiant heating and cooling systems: ceiling mounted radiant panels, chilled beams, pipe embedded ceilings, walls, and floors. In those system alternatives, ceiling mounted radiant panels are widely used and frequently installed on T-bar grids designed to support the dropped acoustical ceiling. The ceiling mounted radiant panels are top loaded with thermal insulation to prevent heat gain from or loss to the plenum space. In some cases, free hanging metal panels suspended under the room ceiling by wire hangers without topside insulation are also used for space heating and cooling. Both top and bottom surfaces of the free-hanging metal panel are used as heat transfer surfaces. In principle, ceiling mounted radiant panel systems are able to accommodate varying space sensible loads by controlling panel surface temperature. Heat is transferred from the radiant panel by the heat transfer mechanisms of convection and radiation.

Generally, low temperature radiant heating and high temperature radiant cooling are classified as embedded radiant heating and cooling systems and ceiling mounted radiant panel systems.

While ISO 11855 is for embedded radiant heating and cooling systems without an open air gap, ISO 18566 is for radiant heating and cooling panel systems with an open air gap. Because the system specifications for ISO 18566 are different from those of ISO 11855, it was necessary to develop separate ISO standards regarding the design and test methods of the cooling and heating capacity and control.

ISO 18566-1 specifies the comfort criteria, technical specifications and requirements which should be considered in the manufacturing and installation of radiant heating and cooling systems. ISO 18566-2 provides the test facility and test method for heating and cooling capacity of ceiling mounted radiant panels. ISO 18566-3 specifies the design considerations and design processes of ceiling mounted radiant panels. ISO 18566-4 addresses the control of ceiling mounted radiant heating and cooling panels to ensure the maximum performance which was intended in the design stage when the system is actually being operated in a building.

ISO 18566 does not cover the panels that are embedded into the ceiling, wall or floor structure.

This document is partly based on EN 14240, EN 14037 and ASNI/ASHRAE Standard 138.

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Building environment design — Design, test methods and control of hydronic radiant heating and cooling panel systems —

Part 3:
Design of ceiling mounted radiant panels

1 Scope

This document specifies the design of ceiling mounted radiant panels.

This document is applicable to water-based heating and cooling panel systems (free hanging) in residential, commercial and industrial buildings. The methods apply to systems mounted to the ceiling construction with an open air gap.

This document applies to all types of prefabricated radiant panels that are part of the room periphery.

This document does not cover panels embedded into ceiling, wall or floor structures without open air gap and hybrid (combined thermal radiation and forced-convection) ceiling panels.

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.

ISO 18566-1, *Building environment design — Design, test methods and control of hydronic radiant heating and cooling panel systems — Part 1: Definition, symbols, technical specifications and requirements*

ISO 18566-2, *Building environment design — Design, test methods and control of hydronic radiant heating and cooling panel systems — Part 2: Determination of heating and cooling capacity of ceiling mounted radiant panels*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18566-1 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/

4 Symbols

For the purposes of this document, the symbols in ISO 18566-1 apply.

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