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

Part 4:

**Control of ceiling mounted radiant
heating and cooling panels**

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

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*Partie 4: Contrôle des panneaux radiants de chauffage et de
refroidissement 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.
<http://www.iso.org/iso/18566-4-2017>

Introduction

The radiant heating and cooling system consists of heat emitting/absorbing, heat supply, distribution, and control systems. Typical applications are low temperature radiant heating and high temperature radiant cooling. They are classified as embedded radiant heating and cooling systems and prefabricated radiant heating and cooling 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 and operation.

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.

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

Part 4: Control of ceiling mounted radiant heating and cooling panels

1 Scope

This document specifies the control of ceiling mounted radiant heating and cooling panels. The requirements in this document are applicable only to the components of the heating/cooling systems and the elements which are part of the heating/cooling panels and which are installed to provide heating and/or cooling.

This document is applicable to water-based ceiling mounted radiant heating and cooling panels in residential, commercial and industrial buildings. The methods apply to systems mounted under the ceiling with or without open air gaps between the panels and the ceiling.

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*

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.

5 Controls

5.1 General

This clause describes the control of hydronic systems to enable all radiant panel systems to perform as simulated. The design documents shall include specifications for the control system. The control

system shall be capable of varying heating or cooling outputs as well as maintaining predetermined room or surface temperatures.

Control of the heating and cooling system shall enable the specified designed indoor temperatures to be achieved under the specified variation of internal loads and external climate. The control system shall, if specified, protect buildings and equipment against frost and moisture damage where necessary (when normal comfort temperature level is not required) and prevent condensation from occurring.

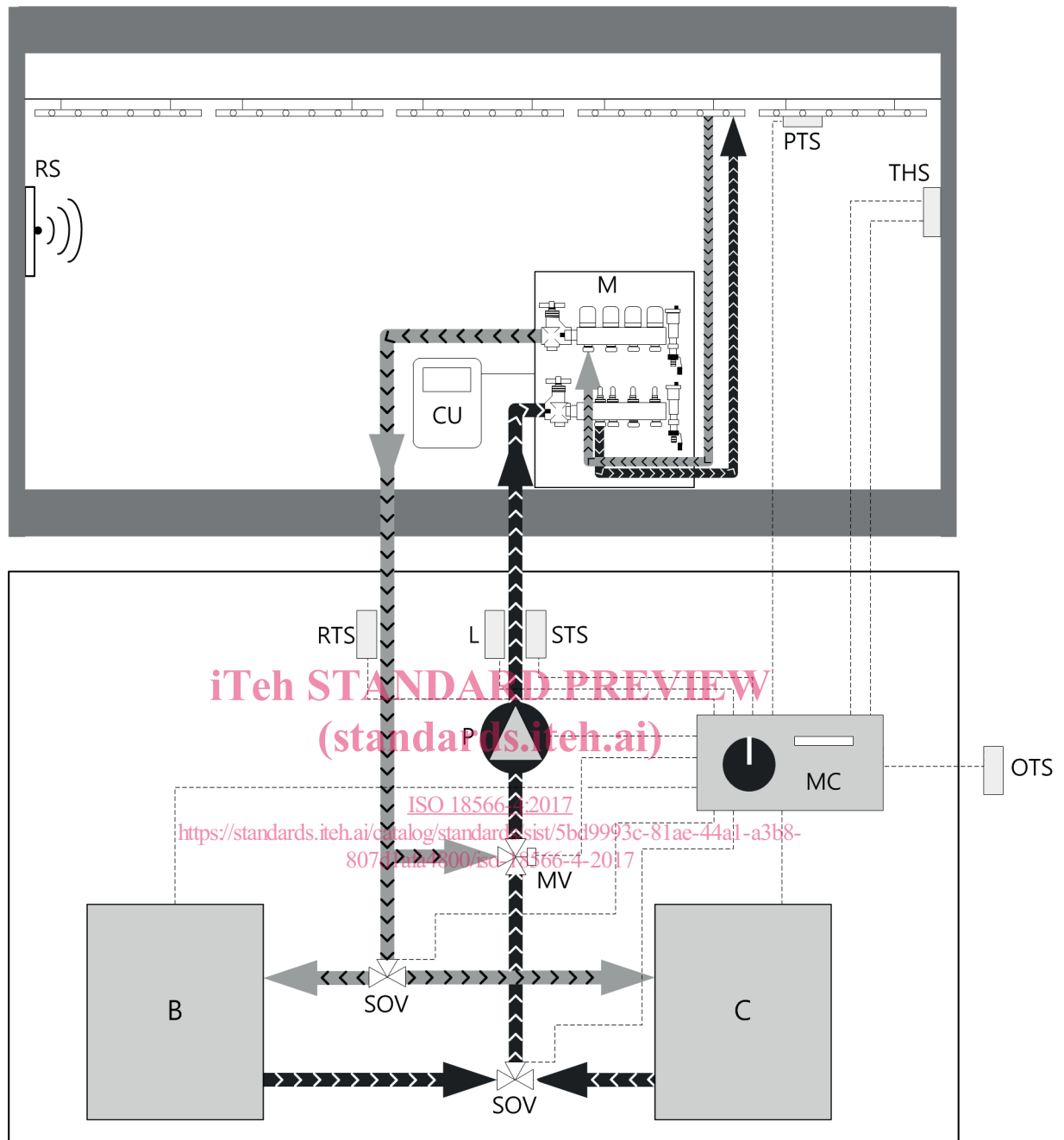
The design of the control system shall take into account the dynamics of the space, its intended use and the effective functioning of the panel system. It shall also ensure efficient use of energy and avoid conditioning the space to full design conditions when not required. This shall include keeping distribution heat losses as low as possible, e.g. by reducing flow rates and temperatures, when normal comfort temperature level is not required. Control of the system will enable control of the conditioning systems to obtain possible savings of operational costs and enable the maintenance of required indoor environmental conditions. The control shall ensure that heating and cooling does not occur at the same time in the same space.

In order to maintain a stable thermal environment, the control system needs to maintain the balance between supplied energy from the system and the losses/gains of the space environment under transient conditions. Slowly varying energy flows in the form of energy losses or gains through the envelope are determined by indoor and outdoor temperature, and direction and speed of wind.

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**Key**

B	boiler	OTS	outside temperature sensor
C	chiller	P	pump
CU	control unit	RS	room sensor
PTS	panel temperature sensor	RTS	return medium temperature sensor
L	limiter	SOV	shut off valve
M	manifold	STS	supply medium temperature sensor
MC	main controller	THS	temperature-humidity sensor
MV	mixing valve		

Figure 1 — Principal diagram of a radiant ceiling panel system for heating and cooling