~~DRAFT AMENDMENT~~

ISO 11855-4:2021/~~DAM~~PRF Amd 1~~:2022(E)~~

~~Secretariat: ANSI~~

ISO/TC 205

Secretariat: ANSI

Date: ~~2022-11-24~~2023-08-23

Building environment design — Embedded radiant heating and cooling systems~~—~~ —

Part 4: Dimensioning and calculation of the dynamic heating and cooling capacity of Thermo Active Building Systems (TABS) ~~AMENDMENT 1~~

AMENDMENT 1

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

Partie 4: Dimensionnement et calculs relatifs au chauffage adiabatique et à la puissance frigorifique pour systèmes d'éléments de construction thermoactifs (TABS)

~~AMENDMENT~~ AMENDEMENT 1

FDIS stage

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11
~~Email~~E-mail: copyright@iso.org
Website: ~~www.iso.org~~www.iso.org

Published in Switzerland

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 document 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~~www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at ~~www.iso.org/patents~~.www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of 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 ~~www.iso.org/iso/foreword.html~~www.iso.org/iso/foreword.html.

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 in buildings,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Field Code Changed

Building environment design — Embedded radiant heating and cooling systems~~—~~ —

Part 4: Dimensioning and calculation of the dynamic heating and cooling capacity of Thermo Active Building Systems (TABS)

~~**DRAFT AMENDMENT 2**~~

AMENDMENT 1

Introduction, last paragraph

Modify to the following:

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 (this document) provides a dimensioning and calculation method to design Thermo Active Building Systems (TABS) – Type V 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 input parameters to ISO 52031.

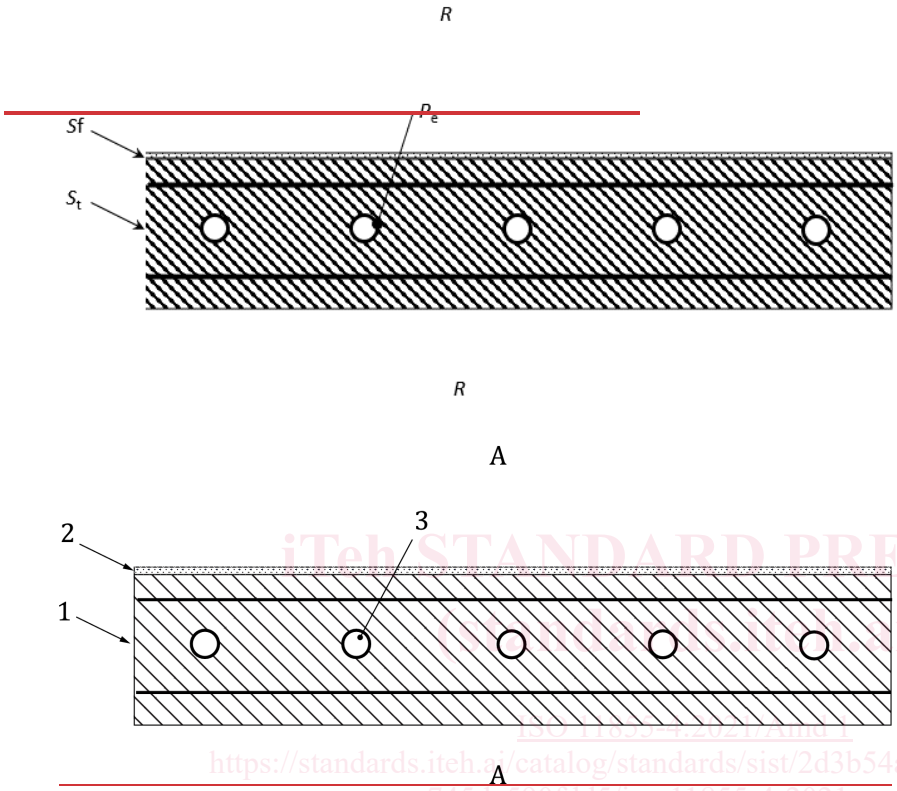
Clause 1, first paragraph

Modify to the following:

This document allows the calculation of peak cooling capacity of Thermo Active Building Systems (TABS) – Type V according to ISO 11855-1, based on heat gains, such as solar gains, internal heat gains, and ventilation, and the calculation of the cooling power demand on the water side, to be used to size the cooling system, as regards, e.g. the chiller size, fluid flow rate.

Clause 5, Figure 1

Modify to the following:



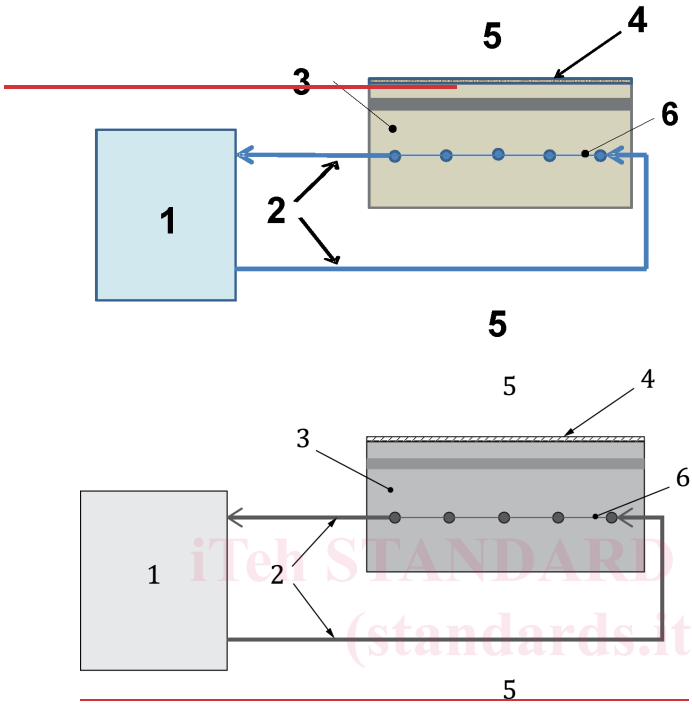
Key

~~P_e~~1 ~~pipes or electric cables~~structural layer
~~S_t~~2 ~~structural~~surface layer
~~S_f~~3 ~~surface layer~~pipes or electric cables
~~R~~A room

Figure 1 — Example of position of pipes in TABS

Clause 5, Figure 2

Modify to the following:



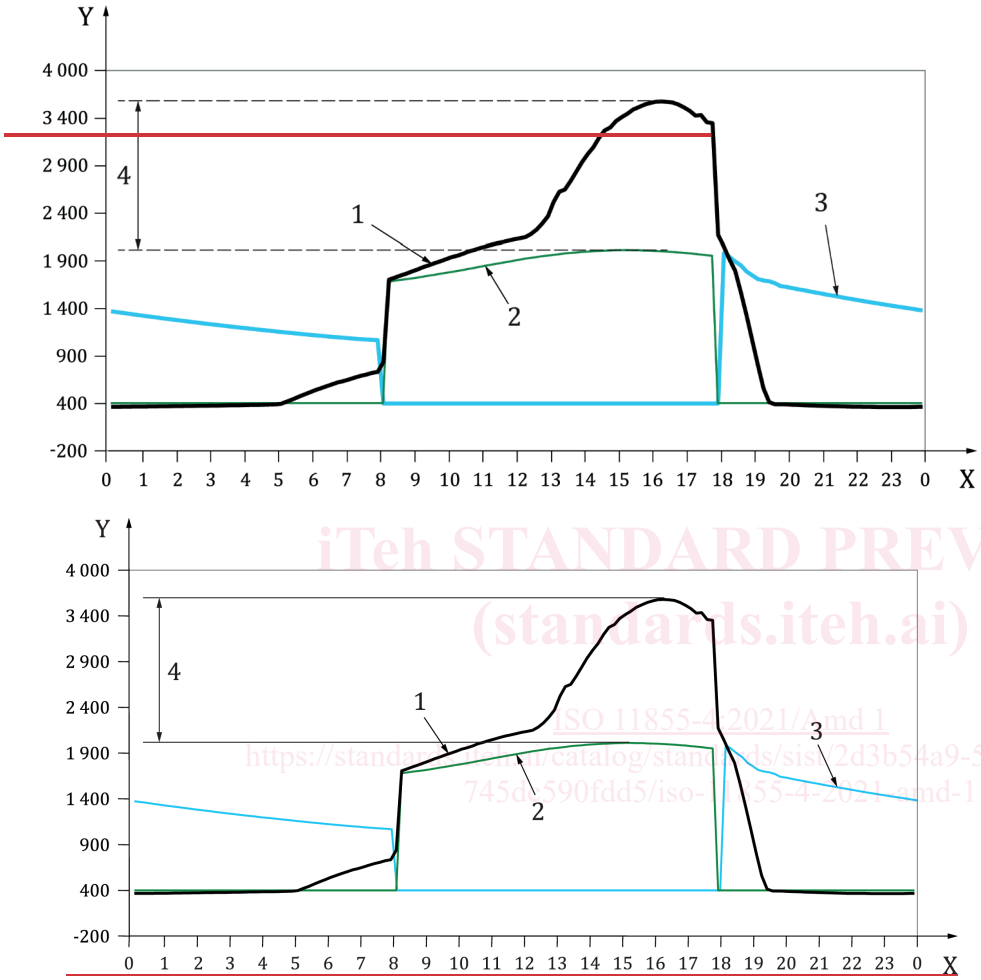
Key

1 heating and cooling equipment
2 hydraulic circuit
3 slab including core layer with pipes and reinforcement
4 possible additional resistances (floor covering or suspended ceiling)
5 room below and room above
6 pipe level

Figure 2 — Simple scheme of a TABS

Clause 5, Figure 3

Modify to the following:



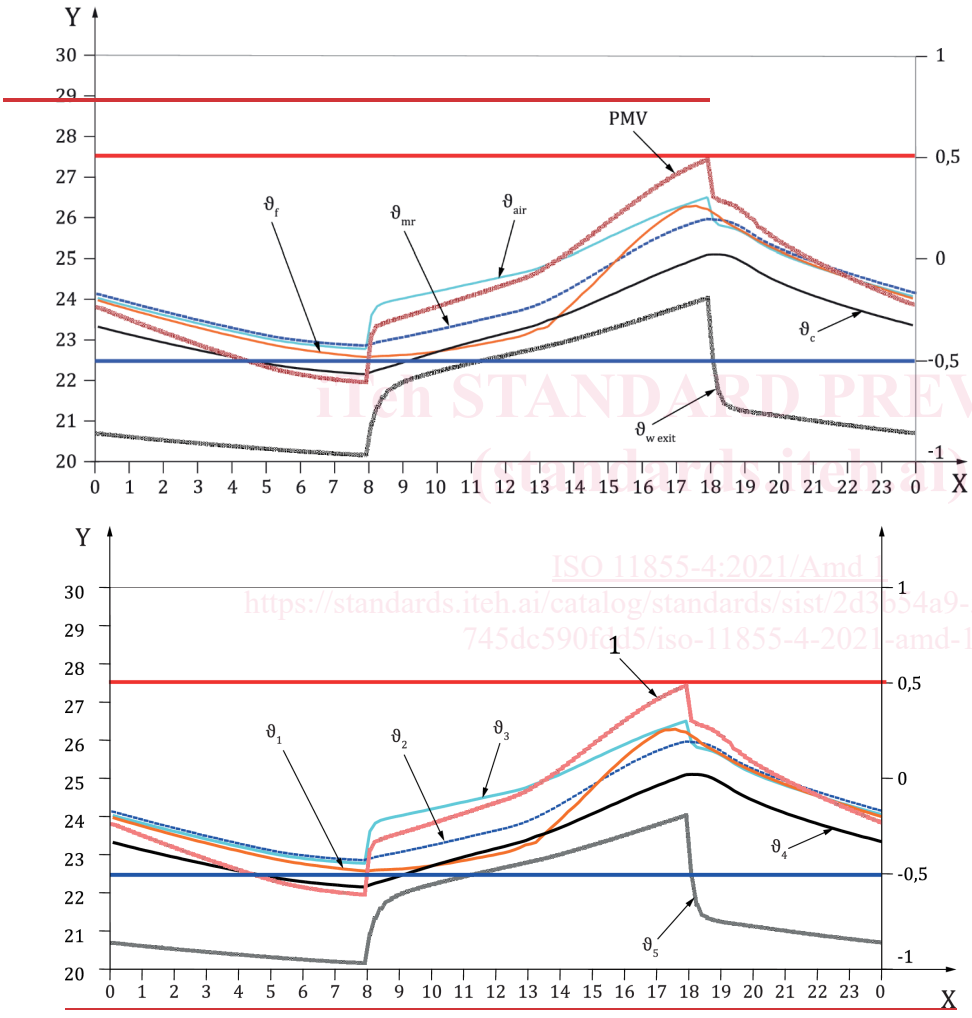
Key

X time, h
Y cooling power, W
1 heat gain
2 cooling power needed for conditioning the ventilation air
3 cooling power needed on the water side
4 reduction of the required peak power

Figure 3 — Example of peak-shaving effect

Clause 5, Figure 4

Modify to the following:



Key

X	time, h
Y	temperature, °C
~~PMV~~1	predicted mean vote
~~θ_{air}~~θ_1	~~air~~floor temperature

$\theta_c \theta_2$ ceilingmean radiant temperature
$\theta_{mr} \theta_3$ mean radiantair temperature
$\theta_f \theta_4$ floorceiling temperature
$\theta_{w\,exit} \theta_5$ water return temperature

Figure 4 — Example of temperature profiles and PMV values vs.versus time

Clause 8

Modify to the following:

To facilitate dynamic computer simulations of buildings with embedded radiant heating and cooling systems, the equivalent resistances between the heat conduction layer (pipe level) and the upward and downward surfaces can be used.

For type V, III, and IV systems (in ISO 11855-1,), this resistance is directly calculated. Both the equivalent inward and outward resistance is calculated.

For type I and II systems (in ISO 11855-1) the equivalent resistance is calculated from the inward specific heat flux, q_i, and outward specific heat flux, q_u, taking into account the surface resistance according to this formula:Formula (5):

Equivalent resistance:

$$R = \Delta\theta/q - 1/h_t \quad (5)$$

where

$\Delta\theta$ is the heating and cooling medium temperature difference in K;

h_t is the total heat transfer coefficient (convection + radiation) between surface and space in W/(m²·K).