



SLOVENSKI STANDARD
SIST EN 14037-1:2004
01-januar-2004

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Ceiling mounted radiant panels supplied with water at temperature below 120 °C - Part 1: Technical specifications and requirements

Deckenstrahlplatten für Wasser mit einer Temperatur unter 120 °C - Teil 1: Technische Spezifikationen und Anforderungen

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Panneaux rayonnants de plafond alimentés en eau à une température inférieure à 120 °C - Partie 1: Spécifications et exigences techniques

[SIST EN 14037-1:2004](https://standards.iteh.ai/catalog/standards/sist/9a6e5128-a451-401e-ac81-f550cd92b5/sist-en-14037-1-2004)

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ICS:

01.040.91

91.140.10

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ICS 01.040.91; 91.140.10

English version

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120 °C - Teil 1: Technische Spezifikationen und
Anforderungen

This European Standard was approved by CEN on 20 February 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 14037-1:2003) has been prepared by Technical Committee CEN /TC 130, "Space heating appliances without integral heat sources", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2003 and conflicting national standards shall be withdrawn at the latest by January 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This European Standard of ceiling mounted radiant panels consists of the following parts:

- Part 1: Technical specifications and requirements,
- Part 2: Test method for thermal output,
- Part 3: Rating method and evaluation of radiant thermal output.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard results from the recognition that the ceiling mounted radiant panels falling into the field of application hereinafter stated are traded on the basis of their thermal output. For evaluating and comparing different ceiling mounted radiant panels it is therefore necessary to refer to a single stipulated value.

1 Scope

This European Standard defines the technical specifications and requirements of ceiling mounted hot water radiant panels fed with water at temperatures below 120 °C supplied by a remote heat source.

The European Standard does not apply to independent heating appliances.

The European Standard also defines the additional common data that the manufacturer shall provide to the trade in order to ensure the correct application of the products.

2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 14037-2:2003, *Ceiling mounted radiant panels supplied with water at temperature below 120 °C - Part 2: Test method for thermal output.*

EN 14037-3:2003, *Ceiling mounted radiant panels supplied with water at temperature below 120 °C - Part 3: Rating method and evaluation of radiant thermal output.*

EN 13501-1, *Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1 heating appliance

device having the purpose of transferring heat in order to provide specific temperature conditions inside buildings

3.2 independent heating appliance

self-contained heating appliance which does not need to be connected to a remote heat source (e. g. a boiler) as it contains its own heat source (e. g. gas fired appliances, electric appliances, heat pump appliances)

3.3 pre-fabricated ceiling mounted radiant panel

pre-fabricated heat-transmitting device in the form of a heating element fitted with connection components and designed to operate on water flow. The panel is freely suspended above the useful space and designed to be a permanent part of the building although not a part incorporated in the building structure

3.4**model**

ceiling mounted radiant panel of defined construction, width and height

3.5**type**

group of models with identical modular cross section

3.6**sample**

ceiling mounted radiant panel whose thermal output shall be determined or has been determined

3.7**inlet water temperature**

bulk temperature of the water entering the ceiling mounted radiant panel

3.8**outlet water temperature**

bulk temperature of the water leaving the ceiling mounted radiant panel

3.9**mean water temperature**

arithmetical mean of inlet and outlet water temperature

3.10**mean radiant temperature**

temperature in a defined point of the room resulting from the radiation of all surrounding surfaces and of the ceiling mounted radiant panel

3.11**reference temperature**

temperature measured with a globe thermometer according to EN 14037-2:2003, 5.5.1

3.12**excess temperature**

temperature difference between mean water temperature and reference temperature

3.13**standard excess temperature**

excess temperature of 55 K measured at a mean water temperature of 75 °C and a reference temperature of 20 °C

3.14**surface temperatures of the inside surfaces of the test room**

mean temperatures of the inside surfaces of the test room

3.15**mean surface temperature of the ceiling mounted radiant panel**

mean temperature on the heating surfaces of the ceiling mounted radiant panel facing the room below

3.16**surface temperature**

maximum inlet water temperature (definition is given for safety requirements only)

3.17**air temperature**

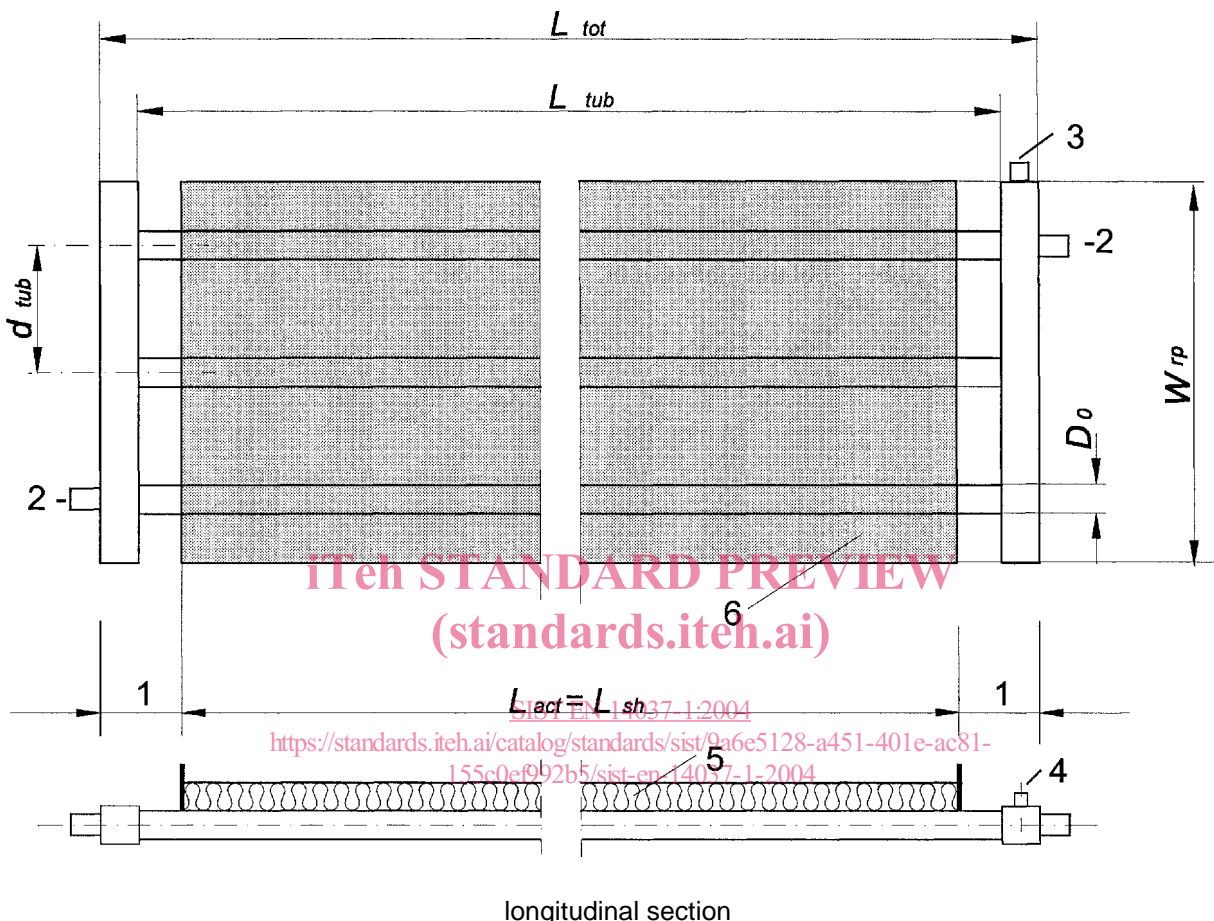
indoor air temperature measured by using radiation shields

3.18**active length of the ceiling mounted radiant panel**

length of the usable heating panel with identical cross section and without connection components and covers, which is bonded together with the water flow components

3.19 connection components

all other components attached to the active length of the ceiling mounted radiant panel which are used for connecting to the distribution system or for venting and draining (see figure 1)



Key

- | | |
|-------------------------|--------------------|
| 1 Connection components | 4 Vent |
| 2 Inlet / outlet | 5 Upper insulation |
| 3 Drain | 6 Radiant sheet |
- $L_{act} = L_{sh}$ (only for this example)

Figure 1 — Example for a typical ceiling mounted radiant panel

3.20 indirect surface (dry surface)

portion of the heating surface of the panel which is in contact with air only (e.g. radiant sheet between the tubes)

3.21 direct surface (wet surface)

portion of the heating surface of the panel which is in contact with the heating medium (water)

3.22 active surface of the ceiling mounted radiant panel

lower panel surface, the lateral edges are not included

3.23 air pressure

pressure of air measured by a barometer at the testing place

3.24**standard air pressure**

standard air pressure is defined as 101,325 kPa (1,01325 bar)

3.25**water flow rate**

amount of water flowing through the ceiling mounted radiant panel, per unit of time

3.26**total output**

thermal output of the active length and of the connection components

3.27**radiant output**

thermal output emitted downwards by radiation of the active length

3.28**standard output**

thermal output at standard excess temperature and standard air pressure

3.29**characteristic equation**

equation that gives the thermal output as a function of the excess temperature at constant water flow rate. The characteristic equation is a power function with a specific characteristic exponent

3.30**construction dimensions**

most important dimensions are defined by following terms.

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Construction length:

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Length of the ceiling mounted radiant panel including the collectors/ headers but excluding the connecting pieces to the heating pipe work.

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Outside diameter of tubes:

For circular type tubes the nominal diameter according to standard tube dimensions is applied. For all other types of tube, the shape and all dimensions necessary to describe exactly the cross section of the tube are to be given.

Distance between tubes:

Distance between the centre lines of two tubes in parallel.

Length of tube:

Length of tubes between collectors / headers.

Length of radiant sheet:

Length of the heat transferring sheets, generally identical with the active length according to 3.18.

Width of ceiling mounted radiant panel:

Width of ceiling mounted radiant panels measured over the outsides of lateral edges.

Thickness of sheet:

Thickness of the radiant sheet.

Height of lateral edges:

Height of lateral edges of the radiant sheet to hold the upper insulation

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- 3.31
module**
1 m of the active length of a ceiling mounted radiant panel
- 3.32
modular thermal output**
output of one module calculated from the thermal output of the active length
- 3.33
standard modular output**
output of one module at standard conditions
- 3.34
rated thermal output**
thermal output evaluated in accordance to EN 14037-3:2003, clause 5 and referred to the value of the standard modular output
- 3.35
maximum operating pressure**
maximum system pressure, to which the panel may be submitted as stated by the manufacturer
- 3.36
factory test pressure (leak test)**
pressure to which the panel is submitted during the manufacturing process
- 3.37
emissivity**
ratio of emissive power of a surface at a given temperature to that of the black body at the same temperature and with the same surroundings

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4 Symbols and units

For quantities defined in a different part of this standard reference to this part of the standard is made.

Table 1 — Symbols and units

No.	Quantity	Symbol	Unit
1	Total output	Φ_{tot}	W
2	Output of the active length	Φ_{act}	W
3	Output of connection components	Φ_{comp}	W
4	Radiant output	Φ_{rad}	W
5	Rated thermal output	Φ_{D}	W/m
6	Measured output	Φ_{me}	W
7	Standard output of a master panel	$\Phi_{\text{O,s}}$	W
8	Standard output of a master panel of the primary set for interlaboratory comparisons	$\Phi_{\text{M,s}}$	W
9	Repeatability tolerance	s_{o}	W
10	Reproducibility tolerance	s_{m}	W
11	Modular thermal output	Φ_{L}	W/m
12	Standard modular output ^a	Φ_{Ls}	W/m
13	Thermodynamic temperature	T	K
14	Temperature	t	°C
15	Inlet water temperature	t_1	°C
16	Outlet water temperature	t_2	°C
17	Mean water temperature	t_{m}	°C
18	Mean radiant temperature	t_{mrad}	°C
19	Reference temperature	t_{ref}	°C
20	Excess temperature	ΔT	K
21	Standard excess temperature ^a	ΔT_{s}	K
22	Surface temperature of the inside surfaces of the test booth	t_{w}	°C
23	Mean surface temperature of the ceiling mounted radiant panel	t_{rp} ^b	°C
24	Air temperature	t_{a}	°C
25	Stephan Boltzmann constant ($5,67 \times 10^{-8}$)	σ	W/(m ² K ⁴)
26	Emissivity of the test sample	ϵ	-
27	Percentage of radiant output	R	%
28	Specific heat capacity	c_{p}	J/kg K
29	Specific enthalpy	H	J/kg
30	Inlet water enthalpy	h_1	J/kg
31	Outlet water enthalpy	h_2	J/kg
32	Air pressure	p	KPa
33	Standard air pressure	p_{s} ^a	KPa
34	Water flow rate	q_{m}	kg/s
35	Time interval	τ	s
a	"s" indicates that the value is in standard conditions.		
b	"rp" indicates that the symbol is referred to the ceiling mounted radiant panel.		

(continued)