

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electric room heating – Underfloor heating – Performance characteristics –
Definitions, method of testing, sizing and formula symbols**

**Chauffage électrique de locaux – Chauffage par le sol – Caractéristiques de
performance – Définitions, méthode d'essai, calibrage et symboles de formule**

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions	8
4 Method of testing for the determination of characteristics of performance.....	15
4.1 General.....	15
4.2 Standard heating load per unit area.....	16
4.3 Maximum power rating per unit area	16
4.4 Maximum surface temperature.....	16
4.5 Maximum floor surface temperature for underfloor storage heating.....	17
4.6 Room air temperature.....	19
4.7 Internal surface temperatures on the surrounding surfaces of the room	20
4.8 Thermal pre-conditioning of the room to be tested.....	20
4.9 Floor temperature in the case of continuous local hot spots.....	21
4.10 Floor temperature of underfloor storage heating through failure of a switching, controlling or regulation apparatus.....	23
4.11 Floor temperature of controlled underfloor heating and underfloor direct heating through failure of a switching, controlling or regulation apparatus.....	23
4.12 Regulation of room temperature using peripheral areas for underfloor storage heating	23
4.13 Regulation of room temperature using controlled underfloor heating and underfloor direct heating.....	23
4.14 Regulation of room temperature using underfloor warming	24
4.15 Relationship of coefficients of heat transfer.....	24
4.16 Insulating layers.....	24
4.17 Edging insulation strips	25
4.18 Damp-proofing	25
4.19 Electrical auxiliary heating.....	26
4.20 Load distribution layer in electrical underfloor heating	26
4.21 Bedding in or under heating screed or directly below floor covering.....	26
4.22 Dry laying of electrical heating elements	26
4.23 Heating element.....	26
4.24 Heating cable and laminar heating element.....	26
4.24.1 Heating cable for bedding in or under screeding or directly below floor covering.....	26
4.24.2 Heating cable for dry laying.....	26
4.24.3 Laminar heating elements for installation below or in screeding.....	26
4.25 Characteristics of heating cables	27
4.26 Characteristics of laminar heating elements	27
4.27 Cold tails	27
4.28 Point of connection	27
4.29 Bending radius of the heating cable.....	27
4.30 Heating element labelling	27
4.31 Pulsation factor	27
4.32 Installation of heating elements for underfloor direct heating	27
4.33 Adhesive and fixing material.....	28
4.34 Permanent installation areas	28

4.35	Pre-heating of screeding	28
4.36	Floor coverings	28
4.37	Control and regulation equipment	28
4.38	Control and regulation equipment for underfloor storage heating	28
4.39	Control and regulation equipment for controlled underfloor heating and underfloor direct heating.....	28
4.40	Floor temperature measurement.....	28
4.41	Auxiliary supply period	29
4.42	Period of room use.....	29
4.43	Insulation and dielectric resistance of the heating element	29
4.44	Instructions for construction workers.....	29
4.44.1	Protective measures when pouring flooring screed.....	29
4.44.2	Pouring the screed.....	29
4.45	Data for owner and user of the building.....	29
4.46	Report of testing	30
Annex A (informative) Sizing procedure – Range of application and purpose.....		31
A.1	General.....	31
A.2	Basic principles – Basic parameters of the room to be heated	31
A.2.1	General	31
A.2.2	Standard heat load of an underfloor heated room.....	31
A.2.3	Standard heating load per unit area.....	31
A.2.4	Effective heat storage capacity of the room to be heated	32
A.2.5	Peripheral conditions and limiting values	32
A.3	Sizing an underfloor heating system	33
A.3.1	Storage layer depth of an underfloor heating system.....	33
A.3.2	Heat load coverage for the underfloor heated room.....	33
Annex B (informative) Sizing procedure – Examples of sizing procedure of an underfloor storage heating system – Example for a living area		48
B.1	General.....	48
B.2	Standard heat load of an underfloor heated room \dot{Q}_N^*	48
B.3	Standard heat load per unit area \dot{q}_N^*	48
B.4	Storage mass per unit external area of the room $m/\Sigma A_a$	48
B.5	Thickness of storage layer δ	49
B.6	Relation of coefficients of conductivity	49
B.7	Maximum rating per unit area P'_F	50
B.8	Limited rating per unit area P'_{FE}	50
B.9	Heating floor area A_F	50
B.10	Permissible rating P_{ZUL}	50
B.11	Rating of the room P	51
B.12	Rating per unit area R'_N	51
B.13	Mean heating capacity \dot{Q}_F	51
B.14	Auxiliary heating capacity \dot{Q}_Z	51
B.15	Auxiliary heat rating	52
Annex C (informative) Sizing procedure – Example of sizing procedure of an underfloor direct heating system – Example for a living area.....		53
C.1	General.....	53

C.2	Design heating capacity \dot{Q}_H^* of a room with underfloor direct heating.....	53
C.3	Design heating capacity per unit area \dot{q}_H^*	53
C.4	Depth of the heating screed.....	54
C.5	Relation of coefficients of conductivity.....	54
C.6	Maximum rating per unit area P'_F	55
C.7	Limited rating per unit area P'_{FE}	55
C.8	Heating floor area A_F	55
C.9	Permissible rating P_{ZUL}	56
C.10	Rating of the room P	56
C.11	Rating per unit area P'_N	56
C.12	Mean heating capacity \dot{Q}_F	56
C.13	Auxiliary heating capacity \dot{Q}_Z	56
C.14	Formula symbols and units.....	56
Annex D (informative) Complete performance test according to Commission Regulation (EU) 2015/1188.....		59
D.1	Test conditions.....	59
D.2	Definitions.....	59
D.3	Requirements to comply with functions according to Commission Regulation (EU) 2015/1188.....	63
D.3.1	General.....	63
D.3.2	Product equipped with single stage heat output, no room temperature control.....	63
D.3.3	Product equipped with two or more manual stages, no room temperature control.....	63
D.3.4	Product equipped with mechanical room temperature control.....	63
D.3.5	Product equipped with electronic room temperature control.....	63
D.3.6	Product equipped with electronic room temperature control plus day timer.....	63
D.3.7	Product equipped with electronic room temperature control plus week timer.....	64
D.3.8	Product equipped with room temperature control, with presence detection.....	64
D.3.9	Product equipped with room temperature control, with open window detection.....	64
D.3.10	Product equipped with distance control option.....	65
D.3.11	Product equipped with adaptive start control.....	65
D.3.12	Product equipped with working time limitation.....	65
D.3.13	Product equipped with black bulb sensor.....	66
D.4	Information provided at point of sale.....	66
Annex E (informative) Climatic test room.....		67
E.1	Climatic test room A.....	67
E.2	Climatic test room B.....	68
Bibliography.....		69
Figure 1 – Layout diagram of an underfloor heating system.....		13
Figure 2 – Construction A, cross-section A – B.....		14
Figure 3 – Construction B, cross-section A – B.....		14

Figure 4 – Construction C, cross-section A – B.....	14
Figure 5 – Examples for the effect of floor excess temperature T_E	17
Figure 6 – Basic circuit diagram of underfloor storage heating.....	19
Figure 7 – Underfloor direct heating, controlled underfloor heating and warming – Example of a circuit for individual room regulation (rooms have one heating circuit each).....	21
Figure 8 – Construction of model.....	22
Figure A.1 – Monogram for determining the storage layer depth.....	32
Figure A.2 – Electric underfloor storage heating, sizing chart.....	34
Figure A.3 – Electric underfloor direct and controlled heating, sizing chart.....	35
Figure A.4 – Plan of basement.....	43
Figure A.5 – Plan of ground floor.....	44
Figure A.6 – Plan of upper floor.....	45
Figure A.7 – Cross-section A – B.....	46
Figure A.8 – Cross-section C – D.....	47
Figure B.1 – Ceiling construction.....	48
Figure C.1 – Ceiling construction.....	53
Figure E.1 – Example of a climatic test room.....	68
Table 1 – Minimum coefficient of heat transfer and minimum resistance to thermal conductivity of construction elements.....	25
Table A.1 – $\vartheta_1 - \vartheta'_1 = 0K$	36
Table A.2 – $\vartheta_1 - \vartheta'_1 = 5K$	36
Table A.3 – $\vartheta_1 - \vartheta'_1 = 10K$	37
Table A.4 – $\vartheta_1 - \vartheta'_1 = 15K$	37
Table A.5 – $\vartheta_1 - \vartheta'_1 = 20K$	38
Table A.6 – $\vartheta_1 - \vartheta'_1 = 30K$	38
Table A.7 – $\vartheta_1 - \vartheta'_1 = 35K$	39
Table A.8 – $\vartheta_1 - \vartheta'_1 = 38K$	39
Table B.1 – Determination of heat conductivity coefficient U_O	49
Table B.2 – Determination of heat conductivity coefficient U_U	50
Table C.1 – Determination of heat conductivity coefficient U_O	54
Table C.2 – Determination of heat conductivity coefficient U_U	55

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC ROOM HEATING – UNDERFLOOR HEATING –
PERFORMANCE CHARACTERISTICS – DEFINITIONS, METHOD
OF TESTING, SIZING AND FORMULA SYMBOLS**

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In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62999 has been prepared by subcommittee 59C: Heating appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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ELECTRIC ROOM HEATING – UNDERFLOOR HEATING – PERFORMANCE CHARACTERISTICS – DEFINITIONS, METHOD OF TESTING, SIZING AND FORMULA SYMBOLS

1 Scope

This International Standard applies to electrical underfloor heating of dwellings and all other buildings whose use corresponds to dwellings or is at least similar, having a maximum load bearing in use of 4 kN/m².

This Standard defines the main characteristics of electrical underfloor heating and establishes the method of testing of these characteristics as information for the user.

This Standard does not deal with:

- installation and safety requirements.

Annexes D and E are added for information purposes about performance testing according to the European Commission Regulation (EU) 2015/1188.

2 Normative references

IEC 60335-2-96, *Household and similar electrical appliances – Safety – Part 2-96: Particular requirements for flexible sheet heating elements for room heating*

3 Terms and definitions

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

3.1

electrical underfloor heating system

electrical underfloor heating, switching, control and regulation appliances and electrical installation

3.1.1

underfloor heating

in situ flooring constructed as an electrical underfloor heating system

Note 1 to entry: It is generally laid on a dry, level, load-bearing substructure.

3.1.2

underfloor direct heating

underfloor direct heating, by which the heat generated from electrical energy is transferred with the least possible time lag to the room to be heated mainly via the surface of the floor

Note 1 to entry: There is no restriction on the amount of time electrical energy can be converted into heat.

3.1.3

underfloor warming

underfloor warming increases comfort by means of pleasant warmth on the feet

Note 1 to entry: It is not necessary to calculate the heat load of the room, and the insulating layers as the underfloor warming are not considered when calculating the heat load of the room.

3.1.4

controlled underfloor heating

underfloor direct heating, by which the conversion of electricity into heat may be interrupted according to the provisions laid out in Note 1

Note 1 to entry: The conversion of electricity into heat may be interrupted – for no longer than 2 h continuously – no longer than 8 h total in a 24 h period. The period of use will be equivalent to at least the previous period of interruption.

3.1.5

underfloor storage heating

underfloor heating, by which the electrical energy is converted into heat and transferred with an intended time lag to the room to be heated mainly via the surface of the floor

Note 1 to entry: The charging takes place during the charging time period t_F and, as a rule, during an additional charging time t_{ZF} of minimum 2 h.

3.1.6

underfloor storage heating system

underfloor heating, auxiliary heating, switching, control and regulation appliances and electrical installation

3.1.7

electrical auxiliary heating

necessary heating equipment with a rating Q_Z in the room being heated, additional to, and different from, the underfloor heating (e.g. periphery heating, convector panels, etc.)

3.1.8

heating circuit

independently switched, regulated or controlled section of an underfloor heating system

3.2

duration of design charge

duration of the charge for which the storage heating system is designed and which is determined as the basis for testing

Note 1 to entry: It constitutes the largest continuous charging time within a period of 24 h.

3.3

auxiliary charge

sum of the auxiliary charging times occurring between two design charge times

3.4

designed rating of a heating element

manufacturer's stated power rating for the heating element in W at the design voltage

3.5

capacity of a room

capacity in W of underfloor heating in a room is the sum of the measured power ratings of the installed heating elements of an underfloor heating system in that room

3.6

design temperature

ϑ_N

highest permissible heating cable nominal temperature in °C, taking into consideration the specific operating properties, such as heat resistance of heat and sound insulation materials

Note 1 to entry: The design limiting temperature is the highest permissible temperature which is allowed by the manufacturer of the surface heating element.

**3.7
maximum surface temperature**

temperature which, for physiological purposes, cannot be exceeded on the uncovered upper surface of the flooring

Note 1 to entry: This temperature may be exceeded in peripheral areas.

**3.8
standard internal temperature**

value of the room temperature necessary for the calculation, t_i in °C; it is the resulting temperature, defined as the mean of the dry air temperature and the mean radiant temperature

**3.9
standard heat load of an underfloor heated room**

\dot{Q}_N^*

standard heat load of an underfloor heated room, it is used only to size the underfloor heating

Note 1 to entry: Its value (as with that of the standard heat load of an underfloor heated room \dot{Q}_N^*) in W, is calculated, taking into account the partially limited heating of the rooms in the dwelling. Areas of the room which are equipped with surface heating elements (flooring, ceiling) remain unconsidered. To differentiate between the standard heat load \dot{Q}_N in W this value will be denoted as the standard heat load of an underfloor heated room, \dot{Q}_N^* in W.

**3.10
standard heat load per unit surface area**

\dot{q}_N^*

standard heat load \dot{Q}_N^* related to the area of the flooring surface A of the room to be heated, in W/m²

$$\dot{q}_N^* = \frac{\dot{Q}_N^*}{A}$$

**3.11
design heating capacity of a room with an underfloor direct heating system**

\dot{Q}_H^*

design heating capacity of a room with underfloor direct heating \dot{Q}_H^* in W

**3.12
design heating capacity per unit area of a room with an underfloor direct heating system** \dot{q}_H^*

design heating capacity of a room with underfloor direct heating \dot{Q}_H^* in relation to its floor area A in m², in W/m²

$$\dot{q}_H^* = \frac{\dot{Q}_H^*}{A}$$

3.13
maximum capacity per unit area

P_F

largest possible capacity in W/m² which can be installed, taking into account the maximum surface temperature, the construction of the underfloor heating system and the energy supply charging time

3.14
capacity per unit area

capacity P in W in relation to the floor area to be heated A_F

$$P_{IN} = \frac{P}{A_F}$$

3.15
mean heating capacity

average heating capacity in W of the heating floor area for a given time, taking into account the floor upper surface temperature, the standard room temperature and the mean temperature on the inside surfaces of walls and ceilings

3.16
mean heat flow density

q_F

heat flow per surface area in W/m² from the floor to the heated room

3.17
localised hot spots

occur when the floor area is covered with a highly insulating material (such as cushions or mattresses) or by defective switching, regulation or control apparatus. This results in an undue thermal strain on the underfloor heating

3.18
effective heat storage capacity for underfloor storage heating

partial amount of the heat storage capacity of a building (room) in W/m³K, having an influence on the heat load

3.19
storage mass of a heated room in relation to external surface

$m/\Sigma A_a$ in kg/m² is the quotient of the storage mass of the room m in kg and the sum of the external surfaces of the room ΣA_a in m²

3.20
permanent fixture area

non-heating area of the floor surface which is designated for full-surface mounting or the installation of furnishings

Note 1 to entry: The floor areas in WC, shower or bathroom, on which bathroom fittings such as WC, shower or bathtub are to be installed, count as permanent fixture areas.

3.21
peripheral zone area

A_R

floor area with a maximum width of 1 m which heats at a higher temperature, generally in front of glazed external walls or external doors

Note 1 to entry: This is not deemed to be an area of permanent dwelling; in m².