

DIN EN ISO 10211:2018-03 (E)

Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations (ISO 10211:2017)

Contents		Page
	European foreword	4
	Foreword	6
	Introduction	7
1	Scope	10
2	Normative references	10
3	Terms and definitions	11
4	Symbols and subscripts	16
4.1	Symbols	16
4.2	Subscripts	16
5	Description of the method	17
5.1	Output	17
5.2	General description	17
6	Output data and input data	17
6.1	Output data	17
6.2	Calculation time intervals	18
6.3	Input data	18
7	Modelling of the construction	18
7.1	Dimension systems	18
7.2	Rules for modelling	18
7.2.1	General	18
7.2.2	Cut-off planes for a 3-D geometrical model for calculation of total heat flow and/or surface temperatures	18
7.2.3	Cut-off planes for a 2-D geometrical model	20
7.2.4	Cut-off planes in the ground	21
7.2.5	Periodic heat flows via the ground	22
7.2.6	Adjustments to dimensions	22
7.2.7	Auxiliary planes	24
7.2.8	Quasi-homogeneous layers and materials	24
7.3	Conditions for simplifying the geometrical model	24
7.3.1	General	24
7.3.2	Conditions for adjusting dimensions to simplify the geometrical model	25
7.3.3	Conditions for using quasi-homogeneous material layers to simplify the geometrical model	26
8	Input data specifications	29
8.1	General	29
8.2	Thermal conductivities of materials	30
8.3	Surface resistances	30
8.4	Boundary temperatures	30
8.5	Thermal conductivity of quasi-homogeneous layers	30
8.6	Equivalent thermal conductivity of air cavities	30
8.7	Determining the temperature in an adjacent unheated room	31
9	Calculation method	31
9.1	Solution technique	31
9.2	Calculation rules	31
9.2.1	Heat flows between material cells and adjacent environment	31
9.2.2	Heat flows at cut-off planes	31
9.2.3	Solution of the formulae	31
9.2.4	Calculation of the temperature distribution	32

10	Determination of thermal coupling coefficients and heat flow rate from 3-D calculations	32
10.1	Two boundary temperatures, unpartitioned model	32
10.2	Two boundary temperatures, partitioned model	32
10.3	More than two boundary temperatures	33
11	Calculations using linear and point thermal transmittances from 3-D calculations	34
11.1	Calculation of thermal coupling coefficient	34
11.2	Calculation of linear and point thermal transmittances	34
12	Determination of thermal coupling coefficient, heat flow rate and linear thermal transmittance from 2-D calculations	35
12.1	Two boundary temperatures	35
12.2	More than two boundary temperatures	35
12.3	Determination of the linear thermal transmittance	36
12.4	Determination of the linear thermal transmittance for wall/floor junctions	36
	12.4.1 All cases	36
	12.4.2 Option A	36
	12.4.3 Option B	38
12.5	Determination of the external periodic heat transfer coefficient for ground floors	40
13	Determination of the temperature at the internal surface	41
13.1	Determination of the temperature at the internal surface from 3-D calculations	41
	13.1.1 Two boundary temperatures	41
	13.1.2 More than two boundary temperatures	41
13.2	Determination of the temperature at the internal surface from 2-D calculations	42
	13.2.1 Two boundary temperatures	42
	13.2.2 Three boundary temperatures	42
14	Report	42
14.1	Input data	42
14.2	Output data	43
	14.2.1 General	43
	14.2.2 Calculation of the heat transmission using the thermal coupling coefficient	43
	14.2.3 Calculation of the surface temperatures using weighting factors	43
	14.2.4 Additional output data	43
	14.2.5 Estimate of error	44
	Annex A (normative) Input and method selection data sheet — Template	45
	Annex B (informative) Input and method selection data sheet — Default choices	47
	Annex C (normative) Validation of calculation methods	49
	Annex D (normative) Examples of the determination of the linear and point thermal transmittances	56
	Annex E (normative) Determination of values of thermal coupling coefficient and temperature weighting factor for more than two boundary temperatures	59
	Bibliography	64