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IRISH STANDARD

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**THERMAL BRIDGES IN BUILDING
CONSTRUCTION - CALCULATION OF HEAT
FLOWS AND SURFACE TEMPERATURES -
PART 2: LINEAR THERMAL BRIDGES
(ISO 10211-2:2001)**

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**Thermal bridges in building construction - Calculation of heat
flows and surface temperatures - Part 2: Linear thermal bridges
(ISO 10211-2:2001)**

Ponts thermiques dans les bâtiments - Calcul des flux
thermiques et des températures superficielles - Partie 2:
Ponts thermiques linéaires (ISO 10211-2:2001)

Wärmebrücken im Hochbau - Berechnung der
Warmestrome und Oberflächentemperaturen - Teil 2:
Linienförmige Wärmebrücken (ISO 10211-2:2001)

This European Standard was approved by CEN on 21 July 1999.

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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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

The text of EN ISO 10211-2:2001 has been prepared by Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS, in collaboration with Technical Committee ISO/TC 163 "Thermal insulation", subcommittee 2 "Calculation methods".

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of an identical text or by endorsement, at the latest by September 2001, and conflicting national standards shall be withdrawn at the latest by December 2001.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard consists of two parts. The title of part 1 is "Thermal bridges in building construction - Calculation of heat flows and surface temperatures - Part 1: General methods".

This standard is one of a series of standards on calculation methods for the design and evaluation of the thermal performance of buildings and building components.

Introduction

Part 1 of this standard gives general methods for the calculation of heat flows and surface temperatures of thermal bridges of arbitrary shape and with an arbitrary number of boundary conditions. This part deals with linear thermal bridges bounded by two different thermal environments. For the calculation of surface temperatures, a third boundary temperature applies only if the thermal bridge is in thermal contact with the ground.

A linear thermal bridge can be represented by its cross-section, which provides the basis for a two-dimensional geometrical model.

As the two-dimensional model is a simplification of the real construction, the calculation results are approximations of the results calculated with a three-dimensional model according to EN ISO 10211-1:1995. The errors due to this simplification are related to the length of the linear thermal bridge which is often not specified. The calculation methods given in part 2 are termed "Class B" methods in order to distinguish them from the "Class A" methods given in part 1.

Although similar calculation procedures are used, the procedures are not identical for the calculation of heat flows and of surface temperatures.

Part 2 of this standard lays down criteria which have to be satisfied in order that a calculation method for linear thermal bridges can be described as being "Class B".

Part 2 can be used for the calculation of the linear thermal transmittance of the linear thermal bridge.

Part 2 does not provide reliable results for the assessment of surface condensation. Although accurate internal surface temperatures can be calculated with a two dimensional model, the actual minimum surface temperature can be lower, as a result of other linear or point thermal bridges in the vicinity.

At the intersection of two or three linear thermal bridges a drop of the internal surface temperature occurs. A method to calculate the lower limiting value of the temperature factor at the intersection is given in annex B.

1 Scope

This part 2 of the standard gives the specifications for a two-dimensional geometrical model of a *linear thermal bridge for the numerical calculation of:*

- the linear thermal transmittance of the linear thermal bridge;
- the lower limit of the minimum surface temperatures.

These specifications include the geometrical boundaries and subdivisions of the model, the thermal boundary conditions and the thermal values and relationships to be used.

The standard is based upon the following assumptions:

- steady-state conditions apply;
- all physical properties are independent of temperature;
- there are no heat sources within the building element;
- only one internal thermal environment applies;
- one or two external thermal environments apply.

A second external thermal environment only applies when surface temperatures are calculated and the soil is a part of the geometrical model. In that case the temperature at the horizontal cut-off plane in the soil is the second external thermal environment.

2 Normative references

This European Standard incorporates, by dated or undated reference, 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 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 ISO 7345 | Thermal insulation - Physical quantities and definitions (ISO7345:1987) |
| EN ISO 10211-1:1995 | Thermal bridges in building construction - Heat flows and surface temperatures - Part 1: General calculation methods (ISO 10211-1:1995) |

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this standard the terms and definitions given in EN ISO 7345, EN ISO 10211-1:1995 and the following apply.

3.1.1

linear thermal bridge

thermal bridge with a uniform cross-section along one of the three orthogonal axes

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