

Thermal performance of building components — Dynamic thermal characteristics — Calculation methods

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British Standard

ICS 91.120.10

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National foreword

This British Standard is the English language version of EN ISO 13786:1999. It is identical with ISO 13786:1997.

The UK participation in its preparation was entrusted by Technical Committee B/540, Energy performance of materials, components and buildings, to Subcommittee B/540/1, European Standards for thermal insulation, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, pages 2 to 17 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 November 1999

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ISBN 0 580 29437 4

Amendments issued since publication

Amd. No.	Date	Comments

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English version

Thermal performance of building components — Dynamic thermal characteristics — Calculation methods

(ISO 13786:1999)

Performance thermique des composants de bâtiment — Caractéristiques thermiques dynamiques — Méthodes de calcul
(ISO 13786:1999)

Wärmetechnisches Verhalten von Bauteilen — Dynamisch-thermische Kenngrößen — Berechnungsverfahren
(ISO 13786:1999)

This European Standard was approved by CEN on 4 August 1997.

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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 Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

The text of EN ISO 13786:1999 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”.

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 March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

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

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Introduction

The dynamic thermal characteristics of a building component describe the thermal behaviour of the component when it is subject to variable boundary conditions, i.e. variable heat flow rate or variable temperature on one or both of its boundaries. In this standard, only sinusoidal boundary conditions are considered: boundaries are submitted to sinusoidal variations of temperature or heat flow rate.

The properties considered are thermal admittances and thermal dynamic transfer properties, relating cyclic heat flow rate to cyclic temperature variations. Thermal admittance quantifies the heat storage property of a component. It relates heat flow rate to temperature variations on the same side of the component. Thermal dynamic transfer properties relate physical quantities on one side of the component to those on the other side.

1 Scope

This standard specifies the characteristics related to dynamic thermal behaviour of complete building components and gives methods for their calculation. It also specifies the information on building materials required for its use. Since the characteristics depend on the way materials are combined to form building components, the standard is not applicable to building materials or to unfinished building components.

The definitions given in this standard are applicable to any building component. A simplified calculation method is provided for plane components consisting of plane layers of homogeneous or substantially homogeneous building materials.

The dynamic thermal characteristics defined in this standard can be used in product specifications of complete building components.

The dynamic thermal characteristics can also be used in calculation of:

- the internal temperature in a room;
- the daily peak power and energy needs for heating or cooling;
- the effects of intermittent heating or cooling; etc.

Annex A provides simpler methods for the estimation of the heat capacities in some limited cases. In particular, the methods in Annex A are suitable for the determination of dynamic thermal properties required for the estimation of energy use. These approximations are not appropriate, however, for product characterisation.

Annex B gives the basic principle and examples of applications of the dynamic thermal characteristics defined in this standard.

Annex C provides information for programming the calculation method.

Annex D gives an example of calculation for a building component.

2 Normative references

This 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 the publications apply to this standard only when incorporated in it or by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method (ISO 6946)*.

EN ISO 7345, *Thermal insulation — Physical quantities and definitions (ISO 7345)*.

EN ISO 10211-1, *Thermal bridges in building construction — Heat flows and surface temperatures — Part 1: General calculation methods (ISO 10211-1)*.