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Second edition  
2012-12-15

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# Hygrothermal performance of building components and building elements — Internal surface temperature to avoid critical surface humidity and interstitial condensation — Calculation methods

*Performance hygrothermique des composants et parois de  
bâtiments — Température superficielle intérieure permettant d'éviter  
l'humidité superficielle critique et la condensation dans la masse —  
Méthodes de calcul*



Reference number  
ISO 13788:2012(E)

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Published in Switzerland

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13788 was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 2, *Calculation methods* in cooperation with CEN/TC 89, *Thermal performance of buildings and building components*.

This second edition cancels and replaces the first edition (ISO 13788:2001), which has been technically revised.

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## Introduction

Moisture transfer is a very complex process and the knowledge of moisture transfer mechanisms, material properties, initial conditions and boundary conditions is often limited. Therefore this International Standard lays down simplified calculation methods, which assume that moisture transport is by vapour diffusion alone and use monthly climate data. The standardization of these calculation methods does not exclude use of more advanced methods. If other sources of moisture, such as rain penetration or convection, are negligible, the calculations will normally lead to designs well on the safe side and if a construction fails a specified design criterion according to this procedure, more accurate methods may be used to show that the design will pass.

This International Standard deals with:

- a) the critical surface humidity likely to lead to problems such as mould growth on the internal surfaces of buildings,
- b) interstitial condensation within a building component, in:
  - heating periods, where the internal temperature is usually higher than outside;
  - cooling periods, where the internal temperature is usually lower than the outside;
  - cold stores, where the internal temperature is always lower than outside.
- c) an estimate of the time taken for a component, between high vapour resistance layers, to dry, after wetting from any source, and the risk of interstitial condensation occurring elsewhere in the component during the drying process.

This International Standard does not cover other aspects of moisture, e.g. ground water and ingress of precipitation.

In some cases, airflow from the interior of the building into the structure is the major mechanism for moisture transport, which can increase the risk of condensation problems very significantly. This International Standard does not address this issue; where it is felt to be important, more advanced assessment methods should be considered.

The limitations on the physical processes covered by this International Standard mean that it can provide a more robust analysis of some structures than others. The results will be more reliable for lightweight, airtight structures that do not contain materials that store large amounts of water. They will be less reliable for structures with large thermal and moisture capacity and which are subject to significant air leakage.