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IRISH STANDARD

I.S. EN 15026:2007

ICS 91.080.01

HYGROTHERMAL PERFORMANCE OF

BUILDING COMPONENTS AND BUILDING

ELEMENTS - ASSESSMENT OF MOISTURE

TRANSFER BY NUMERICAL SIMULATION

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

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English Version

Hygrothermal performance of building components and building elements - Assessment of moisture transfer by numerical simulation

Performance hygrothermique des composants et parois de bâtiments - Evaluation du transfert d'humidité par simulation numérique

Wärme- und feuchtetechnisches Verhalten von Bauteilen und Bauelementen - Bewertung der Feuchteübertragung durch numerische Simulation

This European Standard was approved by CEN on 28 February 2007.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 15026:2007) has been prepared by Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by October 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This standard defines the practical application of hygrothermal simulation software used to predict one-dimensional transient heat and moisture transfer in multi-layer building envelope components subjected to non steady climate conditions on either side. In contrast to the steady-state assessment of interstitial condensation by the Glaser method (as described in EN ISO 13788), transient hygrothermal simulation provides more detailed and accurate information on the risk of moisture problems within building components and on the design of remedial treatment. While the Glaser method considers only steady-state conduction of heat and vapour diffusion, the transient models covered in this standard take account of heat and moisture storage, latent heat effects, and liquid and convective transport under realistic boundary and initial conditions. The application of such models has become widely used in building practice in recent years, resulting in a significant improvement in the accuracy and reproducibility of hygrothermal simulation.

The following examples of transient, one-dimensional heat and moisture phenomena in building components can be simulated by the models covered by this standard:

- drying of initial construction moisture;

- moisture accumulation by interstitial condensation due to diffusion in winter;

- moisture penetration due to driving rain exposure;

- summer condensation due to migration of moisture from outside to inside;

- exterior surface condensation due to cooling by longwave radiation exchange;

- moisture-related heat losses by transmission and moisture evaporation.

The factors relevant to hygrothermal building component simulation are summarised below. The standard starts with the description of the physical model on which hygrothermal simulation tools are based. Then the necessary input parameters and their procurement are dealt with. A benchmark case with an analytical solution is given for the assessment of numerical simulation tools. The evaluation, interpretation and documentation of the output form the last part.

Inputs

- Assembly, orientation and inclination of building components

- Hygrothermal material parameters and functions

- Boundary conditions, surface transfer for internal and external climate

- Initial condition, calculation period, numerical control parameters

Outputs

- Temperature and heat flux distributions and temporal variations

- Water content, relative humidity and moisture flux distributions and temporal variations

Post processing

- Energy use, economy & ecology

- Biological growth, rot and corrosion

- Moisture related damage and degradation

The post processing tools are not part of this standard. As far as possible references to publications dealing with these tools is given.

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