

## **Klaas ehitusmaterjalina. Klaasingu valgus- ja päikesekiirguse karakteristikute määramine**

Glass in building - Determination of luminous and solar characteristics of glazing

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 410:2011 sisaldab Euroopa standardi EN 410:2011 ingliskeelset teksti.

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Standard on kättesaadav Eesti standardiorganisatsioonist.

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English Version

## Glass in building - Determination of luminous and solar characteristics of glazing

Verre dans la construction - Détermination des caractéristiques lumineuses et solaires des vitrages

Glas im Bauwesen - Bestimmung der lichttechnischen und strahlungsphysikalischen Kenngrößen von Verglasungen

This European Standard was approved by CEN on 2 January 2011.

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## Foreword

This document (EN 410:2011) has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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

This document supersedes EN 410:1998.

The main changes compared to the previous edition are:

- a) A procedure is provided for the calculation of the spectral properties of laminated glass.
- b) A formula is introduced for determining the total shading coefficient.
- c) Table 3 has been updated to make it more practical.
- d) Table 6 has been updated in line with the 2004 edition of the publication CIE No 15.
- e) The external and internal heat transfer coefficients have been amended slightly to reflect changes to EN 673.
- f) Guidance is also given on how to determine the spectral characteristics of screen printed glass.
- g) New drawings have been introduced for improved clarity and to conform with CEN rules.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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, Croatia, 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

While this European Standard presents the formulae for the exact calculations of the spectral characteristics of glazing, it does not consider the uncertainty of the measurements necessary to determine the spectral parameters that are used in the calculations. It should be noted that, for simple glazing systems where few measurements are required, the uncertainty of the results will be satisfactory if correct measurements procedures have been followed. When the glazing systems become complex and a large number of measurements are required to determine the spectral parameters, the uncertainty is cumulative with the number of measurements and should be considered in the final results.

The term interface used in this European Standard, is considered to be a surface characterized by its transmission and reflections of light intensities. That is, the interaction with light is incoherent, all phase information being lost. In the case of thin films (not described in this European Standard), interfaces are characterized by transmission and reflections of light amplitudes, i.e. the interaction with light is coherent and phase information is available. Finally, for clarity, a coated interface can be described as having one or more thin films, but the entire stack of thin films is characterized by its resulting transmission and reflection of light intensities.

In Annex B, the procedure for the calculation of spectral characteristics of laminated glass makes specific reference to coated glass. The same procedure can be adopted for filmed glass (e.g. adhesive backed polymeric film applied to glass).

## 1 Scope

This European Standard specifies methods of determining the luminous and solar characteristics of glazing in buildings. These characteristics can serve as a basis for lighting, heating and cooling calculations of rooms and permit comparison between different types of glazing.

This European Standard applies both to conventional glazing and to absorbing or reflecting solar-control glazing, used as vertical or horizontal glazed apertures. The appropriate formulae for single, double and triple glazing are given.

This European Standard is accordingly applicable to all transparent materials except those which show significant transmission in the wavelength region 5  $\mu\text{m}$  to 50  $\mu\text{m}$  of ambient temperature radiation, such as certain plastic materials.

Materials with light-scattering properties for incident radiation are dealt with as conventional transparent materials subject to certain conditions (see 5.2).

Angular light and solar properties of glass in building are excluded from this standard. However, research work in this area is summarised in Bibliography [1], [2] and [3].

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 673, *Glass in building — Determination of thermal transmittance (U value) — Calculation method*

EN 674, *Glass in building — Determination of thermal transmittance (U value) — Guarded hot plate method*

EN 675, *Glass in building — Determination of thermal transmittance (U value) — Heat flow meter method*

EN 12898, *Glass in building — Determination of the emissivity*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **light transmittance**

fraction of the incident light that is transmitted by the glass

### 3.2

#### **light reflectance**

fraction of the incident light that is reflected by the glass

### 3.3

#### **total solar energy transmittance (solar factor)**

fraction of the incident solar radiation that is totally transmitted by the glass