SLOVENSKI STANDARD
kSIST FprEN 410:2010

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Steklo v gradbeništvu - Določevanje svetlobnih in sončnih karakteristik stekla

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

Glas im Bauwesen - Bestimmung der lichtechnischen und trahlungsphysikalischen Kenngrößssen von Verglasungen

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

Ta slovenski standard je istoveten z: **FprEN 410**

ICS:

81.040.20	Steklo v gradbeništvu	Glass in building

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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 trahlungsphysikalischen Kenngrößssen von Verglasungen

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If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (FprEN 410:2010) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by NBN.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 410:1998.

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).

1 Scope

This European Standard specifies methods of determining the luminous and solar characteristics of glazing in buildings. These characteristic 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 µm to 50 µm 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 E.1, E.2 and E.3.

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).

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

3.4
solar direct transmittance
fraction of incident solar radiation that is directly transmitted by the glass

3.5
normal emissivity
ratio, in a direction normal to the surface, of the emissive power of the surface of the glass to the emissive power of a black body (see EN 12898)

3.6
solar direct reflectance
fraction of the incident solar radiation that is reflected by the glass

3.7
ultraviolet transmittance
fraction of the incident UV component of the solar radiation that is transmitted by the glass

3.8
colour rendering index (in transmission)
change in colour of an object as a result of the light being transmitted by the glass

3.9
shading coefficient
ratio of the solar factor of the glass to the solar factor of a reference glass (clear float)

4 Symbols

Sym.	Deutsch/German/Allemand	Englisch/English/Anglais	Französisch/French/Français
D_{65}	Normlichtart D65	standard illuminant D65	illuminant normalisé D65
UV	Ultravioletter Strahlungsbereich	ultraviolet radiation	rayonnement ultraviolet
τ_{UV}	Ultravioletter Transmissionsgrad	ultraviolet transmittance	facteur de transmission de l'ultraviolet
$\tau(\lambda)$	Spektraler Transmissionsgrad	spectral transmittance	facteur de transmission spectrale

$\rho(\lambda)$	Spektraler Reflexionsgrad	spectral reflectance	facteur de réflexion spectrale
τ_v	Lichtransmissionsgrad	light transmittance	facteur de transmission lumineuse
ρ_v	Lichtreflexionsgrad	light reflectance	facteur de réflexion lumineuse
τ_e	direkter Strahlungstrans-missionsgrad	solar direct transmittance	facteur de transmission directe de l' énergie solaire
ρ_e	direkter Strahlungs-reflexionsgrad	solar direct reflectance	facteur de réflexion directe de l'énergie solaire
g	Gesamtenergiedurchlaß- grad	total solar energy transmittance (solar factor)	facteur de transmission totale de l'énergie solaire ou facteur solaire
R_a	allgemeiner Farbwieder-gabeindex	general colour rendering index	indice général de rendu des couleurs
D_λ	relative spektrale Vertei- lung der Normlichtart D_{65}	relative spectral distribution of illuminant D_{65}	répartition spectrale relative de l'illuminant normalisé D_{65}
$V(\lambda)$	spektraler Hellempfindlich-keitsgrad	spectral luminous efficiency	efficacité lumineuse relative spectrale
α_e	direkter Strahlungsabsorp tionsgrad	solar direct absorptance	facteur d'absorption directe de l'énergie solaire
ϕ_e	Strahlungsleistung (Strahlungsfluß)	incident solar radiant flux	flux énergétique solaire incident
q_i	sekundärer Wärmeabgabe-grad nach innen	secondary internal heat transfer factor	facteur de réémission thermique vers l'intérieur
q_e	sekundärer Wärme-abgabegrad nach außen	secondary external heat transfer factor	facteur de réémission thermique vers l'extérieur
S_λ	relative spektrale Vertei- lung der Sonnenstrahlung	relative spectral distribution of solar radiation	répartition spectrale relative du rayonnement solaire
h_e	Wärmeübergangs- koeffizient nach außen	external heat transfer coefficient	coefficient d'échange thermique extérieur
h_i	Wärmeübergangs- koeffizient nach innen	internal heat transfer coefficient	coefficient d'échange thermique intérieur
$\mathcal{E}$	korrigierter Emissionsgrad	corrected emissivity	émissivité corrigée
Λ	Wärmedurchlaßkoeffizient	thermal conductance	conductance thermique
λ	Wellenlänge	wavelength	longueur d'onde