SLOVENSKI STANDARD
SIST EN 13363-1:2003+A1:2007

01-oktober-2007

Senļ ila v kombinaciji z zasteklitvijo - Izraļ un prepustnosti za energijo sonļ nega sevanja in prepustnosti svetlobe - 1. del: Poenostavljena metoda

Solar protection devices combined with glazing - Calculation of solar and light transmittance - Part 1: Simplified method

Sonnenschutzeinrichtungen in Kombination mit Verglasungen - Berechnung der Solarstrahlung und des Lichttransmissionsgrades - Teil 1: Vereinfachtes Verfahren

Dispositifs de protection solaire combinés à des vitrages - Calcul du facteur de transmission solaire et lumineuse - Partie 1: Méthode simplifiée

Ta slovenski standard je istoveten z: **EN 13363-1:2003+A1:2007**

ICS:

17.180.20	Barve in merjenje svetlobe	Colours and measurement of light
91.120.10	Toplotna izolacija stavb	Thermal insulation

SIST EN 13363-1:2003+A1:2007 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13363-1:2003+A1

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ICS 17.180.20; 91.120.10

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English Version

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This European Standard was approved by CEN on 7 May 2003 and includes Amendment 1 approved by CEN on 24 May 2007.

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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 CEN Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 13363-1:2003+A1:2007) 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2008 and conflicting national standards shall be withdrawn at the latest by January 2008.

This document includes Amendment 1 approved by CEN on 2007-05-24.

This document supersedes EN 13363-1:2003.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

Annexes A and B are informative.

This standard consists of two parts:

Part 1: Simplified method

Part 2: ⟨A1⟩ Detailed calculation method ⟨A1⟩

⟨A1⟩ Due to the improved thermal properties of insulating glass units an adaptation of the notional parameter G was necessary.

The scope of the standard was made more precise. ⟨A1⟩

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.

1 Scope

This European Standard specifies a simplified method based on the thermal transmittance and total solar energy transmittance of the glazing and on the light transmittance and reflectance of the solar protection device to estimate the total solar energy transmittance of a solar protection device combined with glazing.

The method applies to all types of solar protection devices parallel to the glazing such as louvre, venetian or roller blinds. The position of the solar protection device can be interior, exterior or between single panes in a dual glazing system. It is applicable when the total solar energy transmittance of the glazing is between 0,15 and 0,85. Venetian or louvre blinds are assumed to be adjusted so that there is no direct solar penetration. It is assumed that for external solar protection devices and for integrated solar protection devices, the space between the solar protection devices and the glazing is unventilated and for internal solar protection devices this space is ventilated.

⟨A1⟩ The resulting g-values of the simplified method given here are approximate and their deviation from the exact values lie within the range between +0,10 and -0,02. The results generally tend to lie on the safe side for cooling load estimations. The results are not intended to be used for calculating beneficial solar gains or thermal comfort criteria. The simplified method is based on the normal incidence of radiation and does not take into account either the angular dependence of transmittance and the reflectance or the differences of spectral distribution.

This standard can be applied when the solar transmittance and solar reflectance of the solar protection devices are within the following ranges:

$0 \leq \tau_{e,B} \leq 0,5$ and $0,1 \leq \rho_{e,B} \leq 0,8$

For reflectance and transmittance values outside these ranges EN 13363-2 [1] applies.

An allowance can be made for this fact when applying the method. For cases not covered by the method given in this standard more exact calculations based on the optical properties (in general the spectral data) of glass and solar protection device can be carried out in accordance with EN 13363-2 [1]. A1

2 Normative references

This European 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 these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 410:1998, *Glass in building – Determination of luminous and solar characteristics of glazing.*

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 ISO 7345:1995, *Thermal insulation – Physical quantities and definitions (ISO 7345:1987).*

3 Terms, definitions, symbols and units

For the purposes of this European Standard, the terms and definitions given in EN 410:1998 and EN ISO 7345:1995 apply.

Symbols are given in Table 1.

Subscripts are given in Table 2.

Table 1 — Symbols and units

Symbol	Quantity	Unit
g	total solar energy transmittance	–
U	thermal transmittance	$W/(m^2 \cdot K)$
G	thermal conductance	$W/(m^2 \cdot K)$
α	absorptance	–
ρ	reflectance	–
τ	transmittance	–

Table 2 — Subscripts

Subscript	Definition
B	solar protection device
e	external
g	glazing
t	total
v	visible

4 Characteristic data

4.1 Glazing

Glazing is characterised by the following quantities:

U_g thermal transmittance of the glazing;

g total solar energy transmittance;

τ_v light transmittance of the glazing;

ρ_v light reflectance of the side of the glazing facing the incident radiation;

ρ'_v light reflectance of the side of the glazing facing away from incident radiation.

τ_e solar direct transmittance of the glazing

ρ_e solar direct reflectance of the side of the glazing facing the indent radiation

ρ'_e solar direct reflectance of the side of the glazing facing away from the incident radiation

U_g shall be determined according to EN 673, EN 674 or EN 675.

g, τ_v and ρ'_v shall be determined according to EN 410.

If no detailed data are available, typical data for glazing, indicated in Table A.1, may be used.

4.2 Solar protection devices

Solar protection devices are characterised by the values of transmittance and reflectance for solar radiation and the values of light transmittance and reflectance (see Figure 1):

$\tau_{e,B}$ solar transmittance of the solar protection device;

$\rho_{e,B}$ solar reflectance of the side of the solar protection device facing the incident radiation;

$\rho'_{e,B}$ solar reflectance of the side of the solar protection device facing away from the incident radiation;

$\tau_{v,B}$ light transmittance of the solar protection device;

$\rho_{v,B}$ light reflectance of the side of the solar protection device facing the incident radiation;

$\rho'_{v,B}$ light reflectance of the side of the solar protection device facing away from the incident radiation.

These values are determined by the most appropriate method for normal incidence. If no data are available, typical data for solar protection devices, indicated in Table A.2, may be used.

A1 In the case of louvre or Venetian blinds the above properties shall be used when the blinds are closed. For blinds open to 45° the following corrected values may be used assuming there is no direct solar penetration:

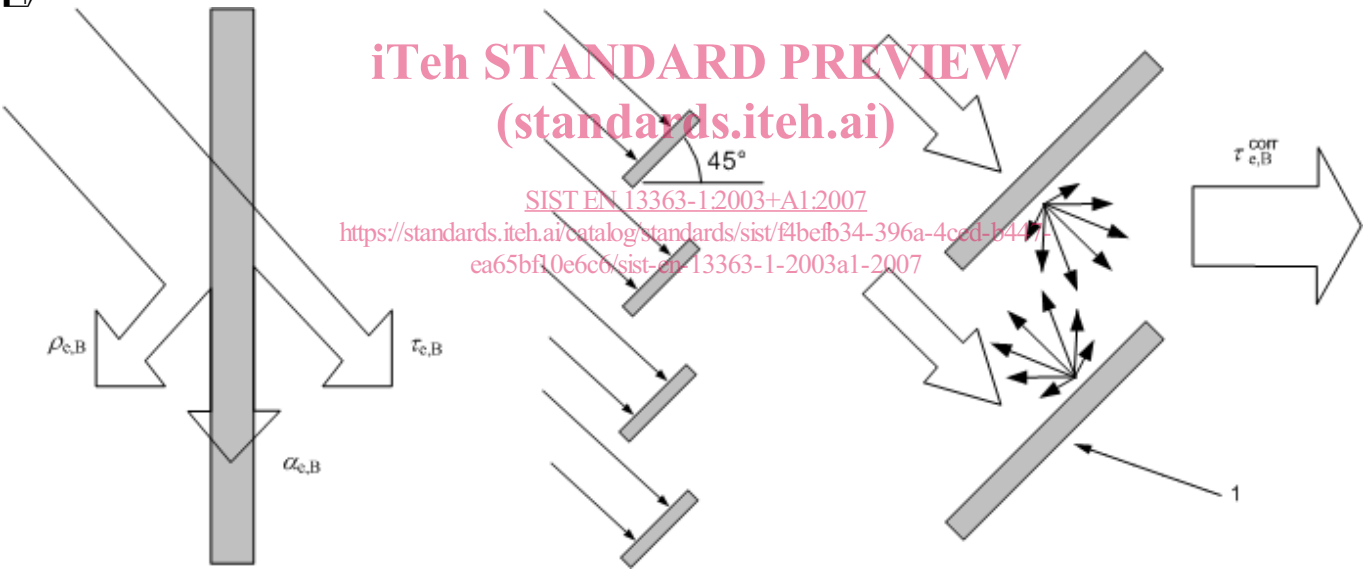
$$\tau_{e,B}^{corr} = 0{,}65 \cdot \tau_{e,B} + 0{,}15 \cdot \rho_{e,B}$$

$$\rho_{e,B}^{corr} = \rho_{e,B} \cdot (0{,}75 + 0{,}70 \cdot \tau_{e,B})$$

The properties of louvre or Venetian blinds can also be calculated in accordance with Annex A of EN 13363-2:2005 [1].

The limitations given in the scope shall be considered. A1

A1



A1

Key

1 Blinds 45°

(a) transmittance, absorptance and reflectance of a solar protection device	b) no direct penetration in the case of louvre or Venetian blinds open to 45°	(c) principle of the correction of the transmittance in the case of blinds open to 45°

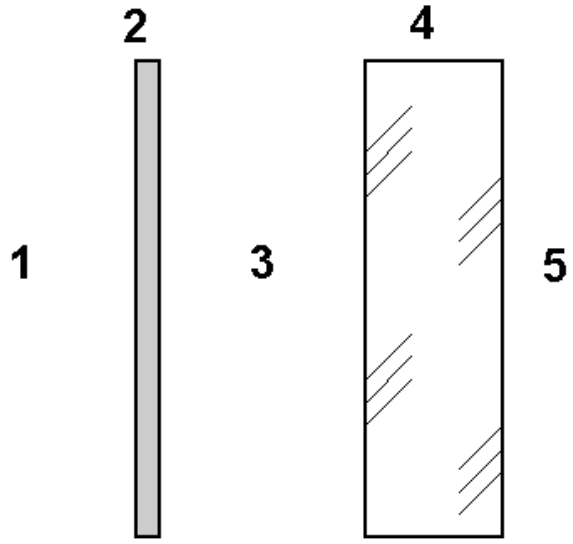
Figure 1 — Principles of solar transmittance of solar protection devices

5 Total solar energy transmittance

NOTE The formulae are based on a simple physical model and the values of the notional parameters G are mathematically fitted to a more precise reference calculation, following the principles of EN 13363-2, *Solar protection devices combined with glazing – Calculation of solar and light transmittance – Part 2: Reference method*. The ventilation assumptions are such that the results are conservative for cooling load estimations.

5.1 External solar protection device

Figure 2 shows schematically the installation of external solar protection devices.



Key

1 Exterior
2 Solar protection device
3 Unventilated air space
4 Glazing
5 Interior

Figure 2 — Characteristic position of external solar protection device

The total solar energy transmittance for glazing and an external solar protection device is given by:

$$g_t = \tau_{e,B}\, g + \alpha_{e,B} \frac{G}{G_2} + \tau_{e,B}(1-g)\frac{G}{G_1} \qquad (1)$$

[A1] where

$\alpha_{e,B} = 1 - \tau_{e,B} - \rho_{e,B}$

$G_1 = 5$ W/(m^2·K)

$G_2 = 10$ W/(m^2·K)

$G = \left(\frac{1}{U_g} + \frac{1}{G_1} + \frac{1}{G_2}\right)^{-1}$ [A1]

5.2 Internal solar protection device

Figure 3 shows schematically the installation of internal solar protection devices.