SLOVENSKI STANDARD
SIST EN 14501:2021

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Nadomešča:
SIST EN 14501:2006

Rolete in polkna - Toplotno in vizualno ugodje - Delovne karakteristike in klasifikacija

Blinds and shutters - Thermal and visual comfort - Performance characteristics and classification

Abschlüsse - Thermischer und visueller Komfort - Leistungsanforderungen und Klassifizierung

Fermetures et stores - Confort thermique et lumineux - Caractérisation des performances et classification

Ta slovenski standard je istoveten z: **EN 14501:2021**

ICS:

91.060.50	Vrata in okna	Doors and windows

SIST EN 14501:2021 **en,fr,de**

EUROPEAN STANDARD

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Blinds and shutters - Thermal and visual comfort - Performance characteristics and classification

Fermetures et stores - Confort thermique et lumineux - Caractérisation des performances et classification

Abschlüsse - Thermischer und visueller Komfort - Leistungsanforderungen und Klassifizierung

This European Standard was approved by CEN on 21 October 2019.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 14501:2021) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.

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

This document supersedes EN 14501:2005.

The main modifications of this project of revision are relating to:

— the revision of the performance classification for the darkening performance;

— the revision of the performance classification for the glare control. The new classification is based on DGP (Daylight Glare Probability) calculations and considers the cut-off angle of the curtain material;

— the addition of a fifth reference glazing (triple glazing);

— the addition of an informative annex giving recommendations on the class for glare control to be used depending on the location and orientation of the building, as well as on the size of the glazed area, the distance from the façade and the light transmittance of the glazing.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is a part of a series of standards dealing with blinds and shutters for buildings as defined in EN 12216.

The characteristics covered by this document are specific requirements that are complementary to the intrinsic requirements that internal blinds, external blinds or shutters shall fulfil in accordance with EN 13120, EN 13561 and EN 13659, respectively.

1 Scope

This document applies to the whole range of shutters, awnings and blinds defined in EN 12216, described as solar protection devices in this document.

It specifies the corresponding properties and classifications:

- relating to thermal comfort:
  - the solar factor (total solar energy transmittance);
  - the secondary heat transfer factor;
  - the direct solar transmittance;
- relating to visual comfort:
  - the darkening performance;
  - the night privacy;
  - the visual contact with the outside;
  - the glare control;
  - the daylight utilization;
  - the rendering of colours.

NOTE For other purposes, more detailed methods using different parameters can be used.

Some of the characteristics (e.g. g_{tot}) are not applicable when solar protection devices are not parallel to the glazing (e.g. folding-arm awnings).

This document is not applicable to the solar protection devices using fluorescent materials.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 410, *Glass in building — Determination of luminous and solar characteristics of glazing*

EN 12216, *Shutters, external blinds, internal blinds — Terminology, glossary and definitions*

EN ISO 52022-1, *Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 1: Simplified calculation method of the solar and daylight characteristics for solar protection devices combined with glazing (ISO 52022-1)*[1]

EN ISO 52022-3, *Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 3: Detailed calculation method of the solar and daylight characteristics for solar protection devices combined with glazing (ISO 52022-3)*[2]

EN 14500:2021, *Blinds and shutters — Thermal and visual comfort — Test methods*

[1] EN ISO 52022-1 supersedes EN 13363-1.

[2] EN ISO 52022-3 supersedes EN 13363-2.

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in EN 12216 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

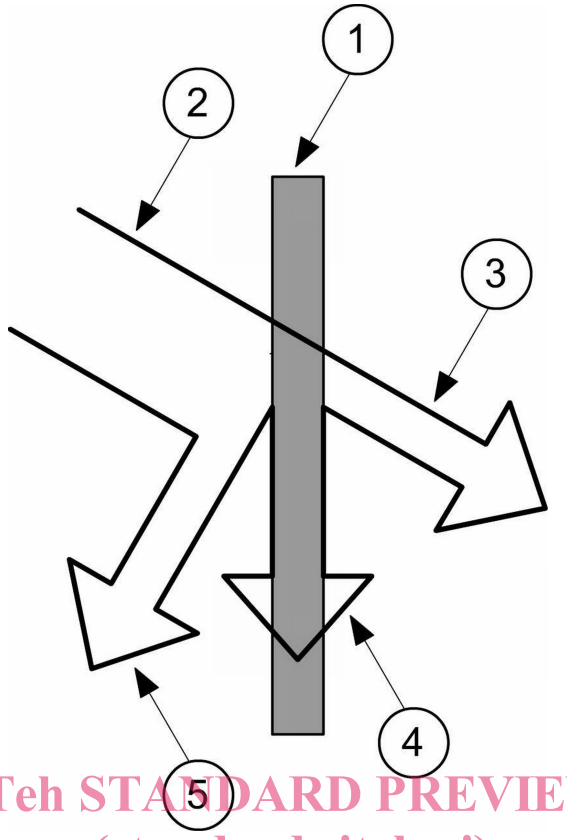
3.1
transmittance
τ
ratio of the transmitted flux to the incident flux (see Figure 1)

Note 1 to entry: A more detailed definition is given in EN 14500:2021.

3.2
reflectance
ρ
ratio of the reflected flux to the incident flux (see Figure 1)

Note 1 to entry: A more detailed definition is given in EN 14500:2021.

3.3
absorptance
α
ratio of the absorbed flux to the incident flux (see Figure 1)



Key

1	solar protection device	4	absorbed radiation $\alpha \cdot E$
2	incident radiation E	5	reflected radiation $\rho \cdot E$
3	transmitted radiation $\tau \cdot E$		

Figure 1 — Representation of the optical factors

3.4
openness coefficient
ratio between the area of the openings and the total area of a fabric

Note 1 to entry: For identical fabrics that differ only by the colour, the openness coefficient is considered as independent of the colour.

Note 2 to entry: The openness coefficient is determined according to EN 14500:2021.

3.5
solar factor
total solar energy transmittance
g
ratio between the total solar energy transmitted into a room through a window and the incident solar energy on the window

Note 1 to entry: g is the solar factor of the glazing alone; g_{tot} is the solar factor of the combination of a glazing and a solar protection device.

3.6
secondary internal heat transfer factor
$q_{i,\,tot}$
part of the total absorbed radiation which is flowing inwards through the glazing and the combined shading device

3.7
colour rendering index
R_a
index designed to express synthetically a quantitative evaluation of the differences in colour between eight test colours lit directly by the standard illuminant D_{65} and by the same illuminant transmitted through the solar protection device

3.8
operative temperature
θ_{op}
uniform temperature of a room in which an occupant would exchange the same amount of heat by radiation plus convection as in the actual non-uniform environment

Note 1 to entry: For more information on the calculation of $\theta_{op,}$ it is recommended to refer to EN ISO 13791 or EN ISO 13792.

3.9
light exclusion system
part of the solar protection device intended to reduce peripheral light penetration

Note 1 to entry: A guiding system may qualify as a light exclusion system, but only if the curtain penetrates the guiding channels.

3.10
cut-off angle
first angle of incidence at which the direct light transmittance is no longer perceivable

Note 1 to entry: A more detailed definition is given in EN 14500:2021.

4 Notations used

4.1 General

For the purpose of this document, the optical factors τ (transmittance), ρ (reflectance) and α (absorptance) are labelled with subscripts which indicate:

— the visual or solar properties;

— the geometry of the incident and the transmitted or reflected radiation.

4.2 Visual or solar properties

According to the respective spectrum, the following subscripts are used:

— « $_e$ » solar (energetic) characteristics, given for the total solar spectrum, (wavelengths λ from 300 nm to 2 500 nm), according to EN 410;

— « $_v$ » visual characteristics, given for the standard illuminant D_{65} weighted with the sensitivity of the human eye (wavelengths λ from 380 nm to 780 nm), according to EN 410.

4.3 Geometry of the radiation

The following subscripts are used to indicate the geometry of the incident radiation and the geometry of the transmitted or reflected radiation (see Figure 2):

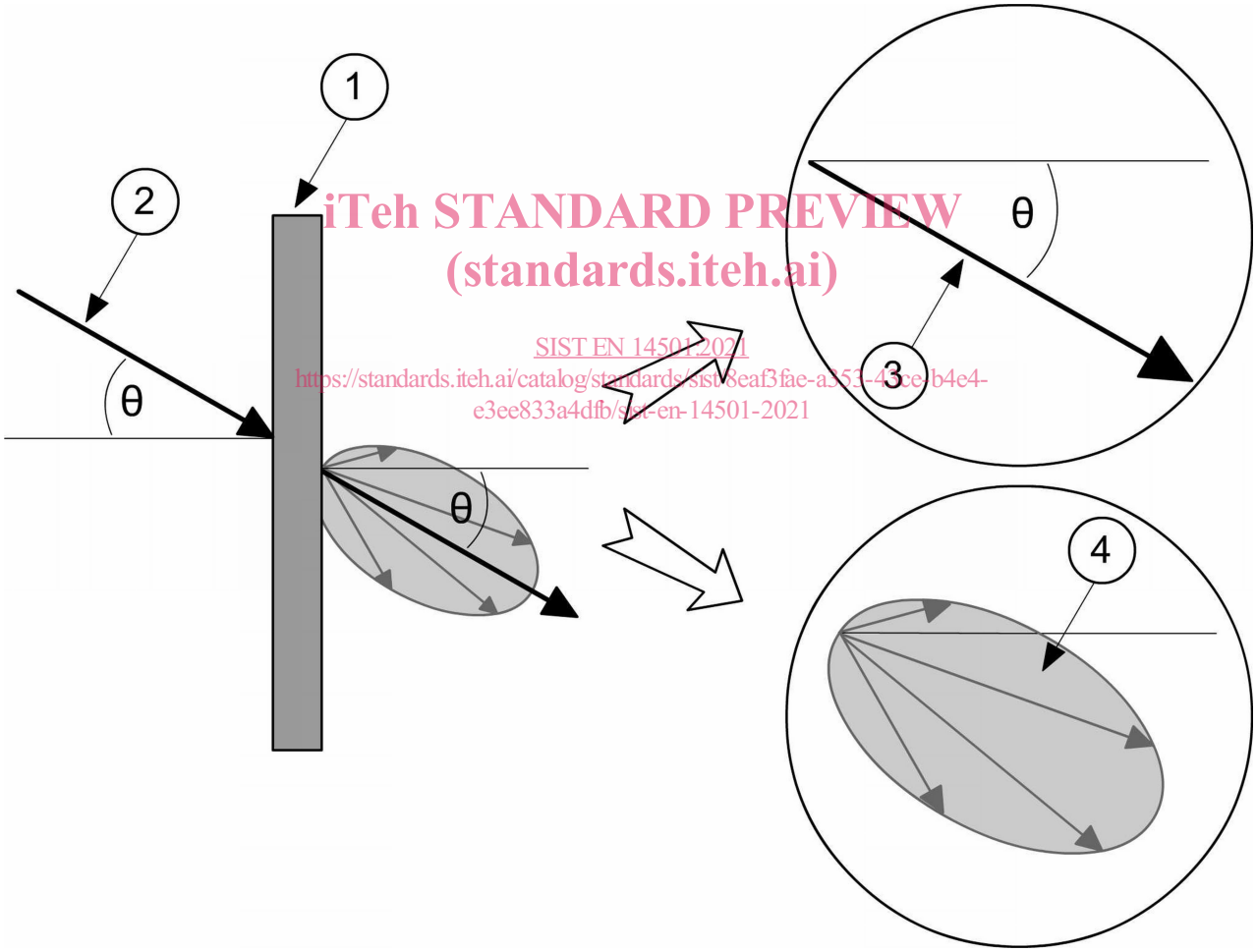
— « $_{dir}$ » for directional (fixed, but arbitrary direction θ);

— « $_{n}$ » for normal, or near normal in case of reflected radiation, the angle of incidence is θ = 0°, or θ ≤ 8° respectively;

— « $_{h}$ » for hemispherical (collected in the half space behind the sample plane);

— « $_{dif}$ » for diffuse.

NOTE A more detailed definition is given in EN 14500:2021.



Key

1 solar protection device
2 incident directional light or solar radiation
3 transmitted direct component of light or solar radiation
4 transmitted diffuse component of light or solar radiation

Figure 2 — Direct and diffuse components of transmitted radiation

4.4 Optical factors

The optical factors are designated as follows:

— $\tau_{e, n\text{-}n}$ normal/normal solar transmittance;

— $\tau_{v, n\text{-}n}$ normal/normal light transmittance;

— $\tau_{v, n\text{-}dif}$ normal/diffuse light transmittance;

— $\tau_{v, n\text{-}h}$ normal/hemispherical light transmittance;

— $\tau_{v, dif\text{-}h}$ diffuse/hemispherical light transmittance.

5 Thermal comfort

5.1 General

Thermal comfort is mainly governed by the operative temperature θ_{op} within the room. θ_{op} depends on the air temperature, the air velocity and the temperature of the surrounding surfaces.

Solar gains shall be controlled in order to limit the operative temperature. The classification of the total solar energy transmittance g_{tot} is given in 5.2.4.

Solar protection devices influence the thermal comfort in three aspects:

— the mean operative temperature and/or the cooling loads are influenced by the solar gains which mainly depend on the size of the windows and the total solar energy transmittance g_{tot};

— the solar protection device may cause higher local values of θ_{op} when irradiated by the sun due to higher temperatures on the inner surface of the glazing or solar protection device. This effect is quantified by the secondary internal heat transfer factor $q_{i, tot}$;

— the solar protection device may prevent persons and surroundings in the room from being irradiated directly. This effect is quantified by the direct-direct solar transmittance $\tau_{e, dir\text{-}dir}$.

The performance classes for the thermal comfort used in the following clauses are specified in Table 1.

Table 1 — Definition of classes

Class	**Influence on thermal comfort**				
	0	1	2	3	4
	very little effect	little effect	moderate effect	good effect	very good effect

5.2 Control of solar gains – Total solar energy transmittance g_{tot}

5.2.1 General

The limitation of solar gains is one of the most important aspects of summer thermal comfort. It also strongly reduces the energy consumption of cooling systems. The solar gains are directly proportional to the total solar energy transmittance g_{tot}.

g_{tot} depends on the glazing and the solar protection device. g_{tot} may be determined using either the methodology given in 5.2.2 or in 5.2.3. When the glazing specifications are unknown, any one of the eight different reference glazing given in Annex A may be used.