

BASIC PRINCIPLES (EN 14501)

Thermal and visual performances of solar protection devices are characterised by the European Standard EN 14501 "Blinds and shutters – Thermal and visual comfort – Performance characteristics and classification".

This standard defines performance classes on:

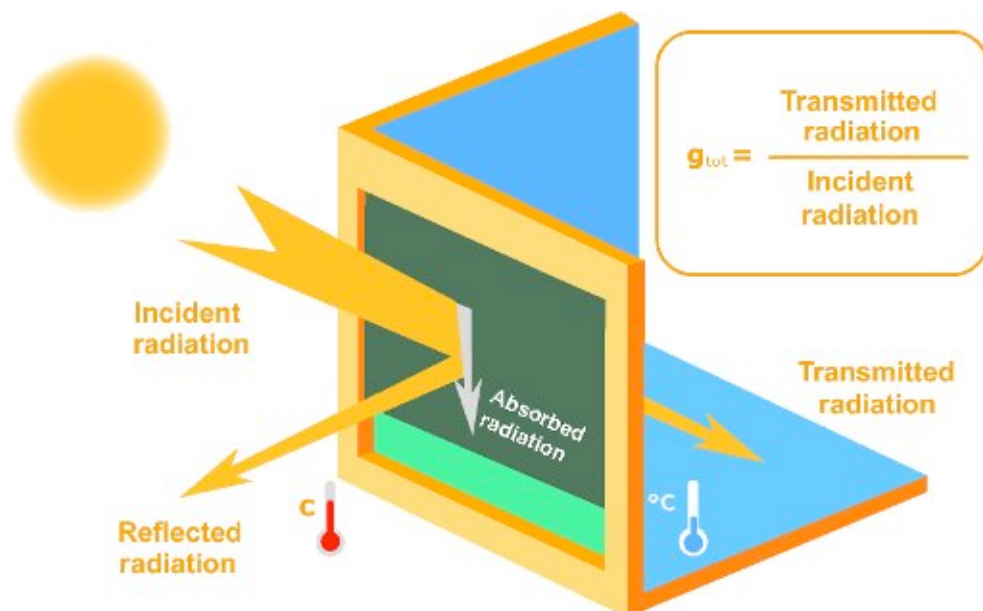
- The thermal comfort, covering the following characteristics:
 - **The solar factor,**
 - The secondary heat transfer factor,
 - The direct solar transmittance.
- The visual comfort, covering the following characteristics:
 - The opacity control,
 - The night privacy,
 - The visual contact with the outside,
 - The glare control,
 - The daylight utilisation,
 - The rendering of colours.

The thermal comfort

Control of solar gains: the total solar factor g_{tot}

The solar gains are directly proportional to the total solar factor of the window g_{tot} (glazing + solar protection device).

The total solar factor g_{tot} is the ratio of the energy transmitted through a window fitted with a solar protection device over the incident solar energy.



Total solar factor g_{tot} of a window

For thermal issues, the solar factor is the most important propriety for a textile. **Its value characterises its thermal performance.**

The standard EN 14501 defines the following classification.

Total solar factor classification (according to EN 14501)

Class	g_{tot}^1	Evaluation
4	$g_{tot} < 0.10$	Very good effect
3	$0.10 \leq g_{tot} < 0.15$	Good effect
2	$0.15 \leq g_{tot} < 0.35$	Moderate effect
1	$0.35 \leq g_{tot} < 0.50$	Little effect
0	$g_{tot} \geq 0.50$	Very little effect

¹ Total solar factor "glazing + textile"

The total solar factor g_{tot} takes into account the textile performance but **also the performance of the glazing** to which it is associated.

Therefore, the standard EN 14501 has defined four reference glazing to make calculations of the total solar factor. The performances of these glazing are presented below.

Reference glazing properties (according to EN 14501)

Glazing	U^2	g^3
A : clear single glazing	5.8	0.85
B : clear double glazing	2.9	0.76
C : low emission double glazing	1.2	0.59
D : reflective double glazing with a low emission layer	1.1	0.32

² Thermal transmittance of the glazing alone (W/m^2K)

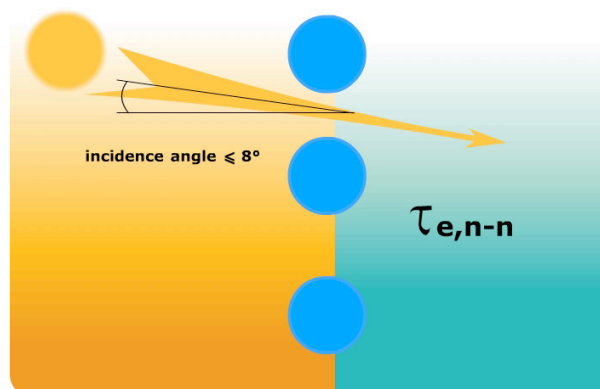
³ Solar factor of the glazing alone

The standard defines the glazing C as the default glazing (when the glazing used for calculations is not declared by the manufacturer).

TEXTINERGIE considers glazing B, C and D in its simulations.

Protection from direct transmission: direct solar transmittance $\tau_{e,n-n}$

This value characterises the ability of a textile to **protect persons and surroundings from direct irradiation**. This propriety is quantified by the normal/normal solar transmittance $\tau_{e,n-n}$ measured for an angle of incidence less than or equal to 8° .



Direct solar transmittance

The standard EN 14501 defines the following classification.

Direct solar transmittance classification (according to EN 14501)

Class	$\tau_{e, n-n}$	Evaluation
4	$\tau_{e, n-n} < 0.05$	Very good effect
3	$0.05 \leq \tau_{e, n-n} < 0.10$	Good effect
2	$0.10 \leq \tau_{e, n-n} < 0.15$	Moderate effect
1	$0.15 \leq \tau_{e, n-n} < 0.20$	Little effect
0	$\tau_{e, n-n} \geq 0.20$	Very little effect

The visual comfort

The standard EN 14501 specifies a classification for the following visual performances.

Glare control

It is the capacity of a textile to control the luminance level of windows (disruptive luminosity) and to reduce the luminance contrasts between different zones within the field of vision.

Visual contact with the outside

It is the capacity of a textile to allow an exterior view when it is fully extended.

Daylight utilisation

It is the capacity of a textile to optimise the available daylight.

Night privacy

It is the capacity of a textile to protect persons from external view, at night, in normal lighting conditions.

Opacity control

It is the capacity of a textile to preclude the vision of outside light. The performance of products is expressed by the level of illuminance (in lux) under which no light is perceivable by an observer behind the device, the textile being illuminated.