



EXTERNAL SHADING UV CLASSES - Suv

ES-SO INDUSTRY GUIDELINES

Classification of UV filtration of a fabric used as a component of a complete solar shading system

1 Scope

This document defines test and calculation methods that must be used to determine the UV transmission of a fabric intended to fit an external solar shading system. It gives the UV filtration properties of that fabric.

It is clearly stated that only the fabric is characterised, independently of the system it is to be fitted to. Its use in the complete system, its position and orientation are not taken into account in this document.

The complete solar shading system may be an external blind, an awning, a shade sail, a pergola, or an umbrella, as described in EN12216.

2 Warning

It is very explicitly stated that this guide is only concerned with the UV-filtering properties of the fabric, not the complete sun protection device. The fabric alone can filter UV rays, but cannot claim to protect the user from UV aggressions.

The reason is that the material of the complete system is not in contact with the skin of the user of the sun protection:

- the system can be vertical, inclined or horizontal.
- it is in no way hermetic to the sun's rays.
- the sun's rays can reach the user directly or indirectly, by reflection from the surrounding surfaces.
- these surfaces can be of very different nature: lawn, water, snow, tarmac, ...

In this situation, it should be understood that, the reverberation from these surfaces could expose the user to non-direct UV radiation.

For this reason, this document applies only to the filtration properties of the material fitted to the complete system.

3 Normative reference

Content of this guide is based on the requirements of EN14500 "Blinds and shutters – Thermal and visual comfort – Test and calculation methods", March 2021.

If there is a problem with the interpretation of the text of this guide, or if an aspect of the subject is not fully covered, EN14500 is the reference to be applied.

EN14500 standard describes the methodology and equipment (spectrophotometer) that are required to measure:

- transmission τ_e of energy through the material
- reflection ρ_e of energy by the material
- absorption α_e of energy by the material

with $\tau_e + \rho_e + \alpha_e = 100\%$.

- transmission τ_v of light through the material
- reflection ρ_v of light by the material
- absorption α_v of light by the material

with $\tau_v + \rho_v + \alpha_v = 100\%$.

- transmission τ_{uv} of UV rays through the material

These values, measured in a specialised laboratory, are easily reported as long and provided the material is plain coloured.

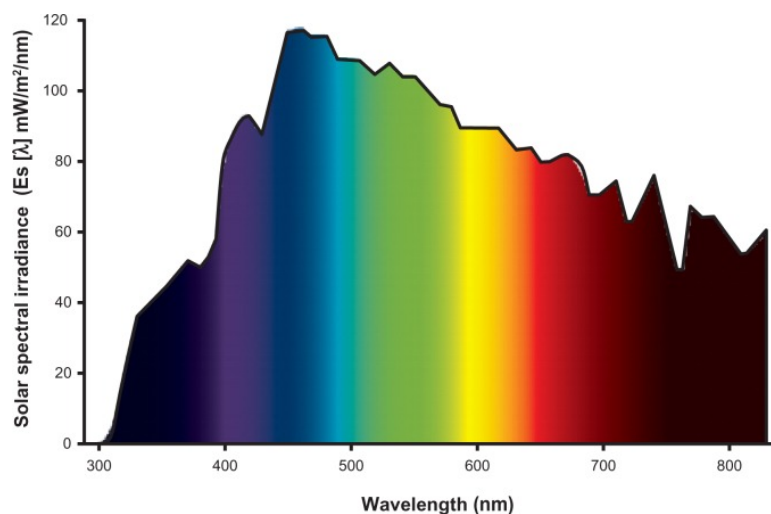
They depend essentially on the weight, colour and construction of the material

They are carefully listed in an official report which should be available on request to the fabric manufacturer.

The last chapter concerning UV filtration classification is based on EN14501 “Blinds and shutters – Thermal and visual comfort - Performance characteristics and classification”

To avoid any confusion with similar terms and avoid the use of Greek symbols in material for consumers we have determined that the description for τ_{uv} for **EXTERNAL SHADING UV CLASSES** should be **Suv**. This will be identified when the standard is next revised.

4 Focus on UV transmission (τ_{uv})



Solar Spectrum in the range UV to short wave

The Sun produces rays with wavelengths ranging from 0 to 2500 nm.

To measure the UV transmission, laboratories only consider wavelengths below 400 nm.

- UVA range between 315 and 400 nm
- UVB range between 280 and 314 nm
- UVC, range from under 280-290 nm, they are stopped by the atmosphere, and never reach Earth.

The laboratory strictly follows test method required by EN14500:

- the incident radiation is normal to the tested sample.
- the measured transmitted radiation is hemispherical (the whole radiation is collected in the half space behind the sample plane)

τ_{uv} (UV transmission) is the combination of UVA and UVB; they are identified in the measurement report submitted by the laboratory which measures all the ultraviolet rays that pass through the sample.

The higher the τ_{uv} , and the closer to 100% (1.00), the less UV filtering the material provides

The lower the τ_{uv} , and the closer to 0% (0.00), the more UV filtering the material provides

The τ_{uv} value is therefore a fairly easy value to interpret; it appears in most technical sales brochures as a percentage between, theoretically, 0% and 100%. We will see in the last paragraph that τ_{uv} of most of materials used for solar protection systems, are actually between 0% and 15%

5 Calculations for non-plain colours of fabrics

Sun filtration fabrics can be solid colours, but they can also be striped, or have various designs. In this case, it is not possible to measure the τ_{uv} in a single operation, as each part of the design has its own colour and therefore its own τ_{uv} .

This guide currently provides a classification for plain colour fabrics. Further work is required for a methodology for striped and patterned fabrics and for louvre systems. The current guidance is that for patterned and stripes it is only possible to claim performance for the colour that is the least performant.

6 Classification for UV filtration of a material

This Guidance on a classification for S_{uv} is in accordance with the procedures of EN14501

EN14501 details a methodology to classify thermal and visual properties of a material. Each material is characterised by values measured according to EN14500.

There is a table for each property:

- thermal comfort
- glare control
- night privacy
- visual contact with the outside
- daylight utilisation

that gives classification from 0 to 4, which is assessed according to the table below:

Class	0	1	2	3	4
Effect	very little	little	moderate	good	very good

T

Class 0	Class 1	Class 2	Class 3	Class 4
Suv > 10%	$10\% \geq \text{Suv} > 7\%$	$7\% \geq \text{Suv} > 4\%$	$4\% \geq \text{Suv} > 2\%$	Suv < 2%

7. Calculations, testing and ES-SDA validation

The ES-SDA database is currently being updated to include Suv calculations.

ISSUE April 2023