



European Solar Shading Products Properties Database
OPTICAL AND THERMAL PROPERTIES OF SOLAR SHADING AND
SHUTTER MATERIALS (May 2017)

PREPARATION OF PRODUCT DATA FILE

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1. INTRODUCTION

This document is a guide to the preparation of fabric/material data files for companies wishing to submit product performance data to ES-SO for inclusion in the **ES-SDA - European Solar Shading Database**:



- A data file which conforms to the prescribed format must be prepared for each fabric/material. Data for the finished product will be presented by an additional word document.
- An ES-SO Peer Review Group, represented by fabric/material and product manufacturers, will according to the guidelines below examine the submitted files. Following completion of the review process the product data will be entered into the ES-SDA - the European Solar Shading Database.
- The data file format is designed to be compatible with the existing European Window Information Systems – WIS database for shading and solar protection devices (WIS has been developed as part of European Union funded activities). It is essential that submitted data files are in the exact format required. Each file will be read as an input file for both the peer review process and for importing into the ES-SO database. Data files which do not conform to the defined format will be returned to the supplier for re-formatting.

The outputs are published on <http://www.es-so-database.com/index.php/database>

2. THE DATA FILE FORMAT

2.1. The Text File

The text file is composed of two separate parts:

- A Header comprising a set of fields required for material identification and performance
- The spectral optical properties of the material (ask the lab to present these data as in 2.4).

The required product data are to be submitted as a "text file", provided by the accredited lab.

i.e. an ASCII file with ".txt" attribute. The text file is often built up using a tool such as an Excel workbook and when completed saved, not as a ".xls" file but as a ".txt" (Text tab delimited) file.

2.2. The Header Fields (material identification and performance)

Each field is identified by a tag and the field's value is the data stored in it. The Field table, information and ranking order required is shown in Table 1.

An example of a completed set of Header fields is shown in Table 2. Note that the Tag identifying the Field and its corresponding value are bounded by the brackets {} and the Tag and Value are separated by a colon (:), e.g. for the Units field {Units: Nanometers} .

Header fields A/B (material) are presented.

Header Field Table A	Fabric material manufacturer (Value to be entered)
{ Units: }	The wavelength unit used for the optical data (Nanometers)
{ Manufacturer: }	Fabric material Supplier Name (text string maximum 50 characters)
{ Product name: }	Name of fabric (text string maximum 50 characters)
{ Reference: }	Supplier reference of fabric (text string maximum 255 characters)
{ Material: }	Description of the material the product is made from (text string maximum 50 characters)
{ Appearance: }	Describe the colour of the fabric. If the fabric is two sided detail the colour on the front side - "Sun Exposed Face" and the colour on the back side - "Room Exposed Face" (text string maximum 255 characters)
{ Thickness: }	Fabric/material thickness in millimetres (mm) Number greater than 0 - in millimetres
{ Orientation: }	[Weft vertical] or [Warp vertical] or [NA (Not Applicable)]
{ Conductivity: }	Thermal conductivity of the fabric material, in $Wm^{-1}K^{-1}$. Number greater than 0.
{ Emissivity front: }	Hemispherical emissivity of the material, front surface. Number greater than 0 and less than 1 (measurement or default value) (*)
{ Emissivity back: }	Hemispherical emissivity of the material, back surface. Number greater than 0 and less than 1.
{ IR transmittance: }	Total hemispherical transmittance in the (far) infrared ($\lambda > 5000$ nm). Number greater than 0 and less than 1 (Openness factor and IR-transmittance are usually equal)
{ Info: }	Add any other information you wish e.g. weight, openness factor. (text string maximum 50 characters)

Header Field Table B	Slat material manufacturer (Value to be entered)
{ Units: }	The wavelength unit used for the optical data (Nanometers)
{ Manufacturer: }	Slat Material Supplier Name (text string maximum 50 characters)
{ Product name: }	Name of slat material (text string maximum 50 characters)
{ Reference: }	Supplier reference of slat material (text string maximum 255 characters)
{ Material: }	Description of the material the product is made from (text string maximum 50 characters)
{ Appearance: }	Describe the front side of the slat. (text string maximum 255 characters)
{ Pitch: }	Number, greater than 0, distance between slats in mm.
{ Thickness: }	Number, greater than 0, thickness of slat in mm.
{ Conductivity: }	Number greater than 0. Thermal conductivity of the slat material, in $Wm^{-1}K^{-1}$
{ Width: }	Number, greater than 0, width of slat in mm.
{ Angle: }	$-90 \leq \text{slat angle} \leq +90$ (only for fixed slats)
{ Crown height: }	positive for convex surface facing outwards, negative for concave surface facing outwards
{ Orientation: }	Vertical or horizontal.
{ Emissivity front: }	Hemispherical emissivity of the material, top surface. Number greater than 0 and less than 1 (measurement or default value).
{ Emissivity back: }	Hemispherical emissivity of the material, back surface. Number greater than 0 and less than 1.
{ IR transmittance: }	Total hemispherical transmittance in the (far) infrared ($\lambda > 5000$ nm). Number greater than 0 and less than 1.
{ Info: }	Add any other information you wish e.g. weight (text string maximum 50 characters)

For manufacturers presenting the finished product information – see 2.2.1
It will refer to materials already on the ES-SDA database.

See document appendix 2.

Table A Header fields required for **ES-SDA fabric material** identification

{ Units: Nanometers}
{ Manufacturer: The Best Fabric Company}
{ Product name: shaderight 3914}
{ Reference: www.thebestfabriccompany.co.uk}
{ Material: fabric}
{ Appearance: front cream/back black}
{ Thickness: 0.6}
{ Orientation: weft vertical}
{ Conductivity: 0.15}
{ Emissivity front: 0.9}
{ Emissivity back: 0.9}
{ IR transmittance: 0.06}
{ Info: weight 290g/sqm, Openness Factor OF: 0.06}

Table B Header fields required for **ES-SDA slat material** identification

{ Units: Nanometers}
{ Manufacturer: The Best Slat Company}
{ Product name: shaderight 3914}
{ Reference: www.thebestshadecompany.co.uk}
{ Material: Aluminium}
{ Appearance: Light grey}
{ Pitch : 72}
{ Thickness: 0.4}
{ Conductivity: 100}
{ Width : 80}
{ Angle : 45}
{ Crown height : 13}
{ Orientation : Horizontal}
{ Emissivity front: 0.9}
{ Emissivity back: 0.9}
{ IR transmittance: 0}
{ Info: weight 290g/sqm}

Note: All Fields are Compulsory ; Text files with empty values for the respective fields should not be returned

2.2.1 Product input Fields (on website); product identification and performance

For **ES-SDA Product** identification the user will be asked to input information on screen. There is the option to upload a finished product on the system. When this option is picked the website will ask you the following:

- Choose an existing manufacturer from the dropdown list. (If the manufacturer is not there then they have not yet subscribed to the service.
- Choose a material from the material list on ES-SDA (*).
- Select your company name from the dropdown box.
- Enter the following details into the form boxes:
 - Product name
 - Reference (www.thebestblindcompany.co.uk)
 - Product type (dropdown box)
 - Position (dropdown box)
 - Delta R EN 13125 (**)
 - Info

(*): the material of the finished product (blind) has already been submitted and confirmed by the Material manufacturer. To use document *appendix 2*.

() The Delta R will be a default value, calculated/proven under the sole responsibility of the manufacturer.**

Note: All inputs are Compulsory

2.3. The Optical Data

The spectral optical properties data for each product are presented in 9 columns.

The first column gives the wavelength of the measured data arranged in order of increasing wavelength, e.g. from 280 – 2500 nm (see Table 3).

Columns 2 – 5 contain spectral transmittance values.

Columns 6 – 9 contain spectral reflectance values.

Columns 1 – 9 inclusive do not have headers, the order of the columns defines the property of the respective values.

An example of the optical properties data presentation format is given in Table 3 for measurements made at **5 nm intervals**.

- * All values shall be given in **3 decimal places** (examples: 0.302 or 0.094) ; **dot is required** (not comma)
- * The measured data shall preferably start at a wavelength of 280 nm (0.280 μm), but in any case **not greater than 300 nm** (or 0.300 μm)
- * The measured data shall end at a wavelength of **2500 nm** (or 2.5 μm) **or more**

2.4. Optical properties nomenclature

Optical properties data are required for **both sides** of a given product (see*).

- The **front surface** is defined as the surface of the shading device normally facing the sun exposed side.
- The **back surface** is defined as the surface of the shading device normally facing the room exposed side.
- The following schemes are usually equivalent:
 - ✓ front ↔ outside ↔ surface 1
 - ✓ back ↔ inside ↔ surface 2
- **The optical properties** are designated as follows:
 - ✓ Total normal – hemispherical transmittance, front surface $\tau_{f,n,h}$
 - Direct component $\tau_{f,n,dir}$
 - Diffuse component $\tau_{f,n,diff}$
 - ✓ Total normal – hemispherical transmittance, back surface $\tau_{b,n,h}$
 - Direct component $\tau_{b,n,dir}$
 - Diffuse component $\tau_{b,n,diff}$
 - ✓ Total normal – hemispherical reflectance, front surface $\rho_{f,n,h}$
 - Direct component $\rho_{f,n,dir}$
 - Diffuse component $\rho_{f,n,diff}$
 - ✓ Total normal – hemispherical reflectance, back surface $\rho_{b,n,h}$
 - Direct component $\rho_{b,n,dir}$
 - Diffuse component $\rho_{b,n,diff}$
- It is most common to firstly measure the total normal – hemispherical transmittance and the total normal – hemispherical reflectance.
- If possible the diffuse component of the total normal – hemispherical transmittance and the total normal – hemispherical reflectance should also be measured and the direct component found by subtracting the measured diffuse component from the respective measured total hemispherical value.
- Hemispherical transmittance, back surface for reflective fabrics
- If one product has a different reflectance on two sides it has to be declared as two different products.

Note negative optical properties values cannot be accepted. For any resultant value less than zero, the value should be set to 0.000.

If the diffuse value is equal to the total value, then the direct value will be equal to zero.

Values for the two respective sides of the product, i.e. front and back, may be equal.

280	0.056	0.002	0.056	0.002	0.000	0.052	0.000	0.052
285	0.057	0.002	0.057	0.002	0.000	0.052	0.000	0.052
290	0.057	0.002	0.057	0.002	0.000	0.054	0.000	0.054
295	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
300	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
305	0.056	0.002	0.056	0.002	0.000	0.055	0.000	0.055
310	0.056	0.002	0.056	0.002	0.000	0.055	0.000	0.055
315	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
320	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
325	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
330	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
335	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
340	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
345	0.057	0.002	0.057	0.002	0.000	0.056	0.000	0.056
350	0.057	0.002	0.057	0.002	0.000	0.057	0.000	0.057
355	0.057	0.002	0.057	0.002	0.000	0.060	0.000	0.060
360	0.057	0.002	0.057	0.002	0.000	0.063	0.000	0.063
365	0.057	0.003	0.057	0.003	0.000	0.068	0.000	0.068
370	0.057	0.003	0.057	0.003	0.000	0.074	0.000	0.074
375	0.057	0.003	0.057	0.003	0.000	0.084	0.000	0.084
380	0.057	0.003	0.057	0.003	0.000	0.098	0.000	0.098
385	0.057	0.004	0.057	0.004	0.000	0.119	0.000	0.119
390	0.057	0.004	0.057	0.004	0.000	0.152	0.000	0.152
395	0.057	0.006	0.057	0.006	0.000	0.195	0.000	0.195
400	0.057	0.008	0.057	0.008	0.000	0.239	0.000	0.239
405	0.057	0.011	0.057	0.011	0.000	0.270	0.000	0.270
410	0.057	0.012	0.057	0.012	0.000	0.284	0.000	0.284
415	0.057	0.013	0.057	0.013	0.000	0.289	0.000	0.289
420	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
425	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
430	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
435	0.057	0.014	0.057	0.014	0.000	0.289	0.000	0.289
440	0.057	0.014	0.057	0.014	0.000	0.288	0.000	0.288
445	0.057	0.014	0.057	0.014	0.000	0.288	0.000	0.288
450	0.057	0.014	0.057	0.014	0.000	0.287	0.000	0.287
455	0.057	0.014	0.057	0.014	0.000	0.286	0.000	0.286
460	0.057	0.014	0.057	0.014	0.000	0.284	0.000	0.284
465	0.057	0.014	0.057	0.014	0.000	0.283	0.000	0.283
470	0.057	0.014	0.057	0.014	0.000	0.282	0.000	0.282
475	0.057	0.015	0.057	0.015	0.000	0.281	0.000	0.281
480	0.057	0.015	0.057	0.015	0.000	0.281	0.000	0.281
485	0.057	0.015	0.057	0.015	0.000	0.280	0.000	0.280
...
...
...
2475	0.054	0.104	0.054	0.104	0.000	0.137	0.000	0.137
2480	0.057	0.104	0.057	0.104	0.000	0.146	0.000	0.146
2485	0.059	0.099	0.059	0.099	0.000	0.140	0.000	0.140
2490	0.057	0.110	0.057	0.110	0.000	0.143	0.000	0.143
2495	0.050	0.108	0.050	0.108	0.000	0.151	0.000	0.151
2500	0.057	0.104	0.057	0.104	0.000	0.145	0.000	0.145

Table 2. Example of data file format for presentation of spectral optical properties data

Column number	Content
1	Wavelength
2	Total normal hemispherical transmittance, Direct component, Front surface, $\tau_{f_n, dir}$
3	Total normal hemispherical transmittance, Diffuse component, Front surface, $\tau_{f_n, diff}$
4	Total normal hemispherical transmittance, Direct component, Back surface, $\tau_{b_n, dir}$
5	Total normal hemispherical transmittance, Diffuse component, Back surface, $\tau_{b_n, diff}$
6	Total normal hemispherical reflectance, Direct component, Front surface, $\rho_{f_n, dir}$
7	Total normal hemispherical reflectance, Diffuse component, Front surface, $\rho_{f_n, diff}$
8	Total normal hemispherical reflectance, Direct component, Back surface, $\rho_{b_n, dir}$
9	Total normal hemispherical reflectance, Diffuse component, Back surface, $\rho_{b_n, diff}$

Table 3: Contents of the spectral data component of the data file.

2.5. Example format of a completed data file

Table 5 shows an example of the resultant format once the Header Fields and the Optical properties data are combined into a single file.

```
{ Units: Nanometers}
{ Manufacturer: The Best Blind Company}
{ Product name: Shaderight}
{ Reference: www.thebestblindcompany.co.uk}
{ Product type: 1}
{ Position: 1}
{ Material: Cloth SPC}
{ Appearance/colour: grey}
{ Thickness: 0.6}
{ Orientation: horizontal}
{ Conductivity: 0.15}
{ Emissivity front: 0.8}
{ Emissivity back: 0.8}
{ IR transmittance: 0.05}
{ Info: Openness Factor OF = 6%}
280  0.056 0.002 0.056 0.002 0.000 0.052 0.000 0.052
285  0.057 0.002 0.057 0.002 0.000 0.052 0.000 0.052
290  0.057 0.002 0.057 0.002 0.000 0.054 0.000 0.054
295  0.057 0.002 0.057 0.002 0.000 0.055 0.000 0.055
300  0.057 0.002 0.057 0.002 0.000 0.055 0.000 0.055
305  0.056 0.002 0.056 0.002 0.000 0.055 0.000 0.055
310  0.056 0.002 0.056 0.002 0.000 0.055 0.000 0.055
315  0.057 0.002 0.057 0.002 0.000 0.055 0.000 0.055
320  0.057 0.002 0.057 0.002 0.000 0.055 0.000 0.055
325  0.057 0.002 0.057 0.002 0.000 0.055 0.000 0.055
```

330	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
335	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
340	0.057	0.002	0.057	0.002	0.000	0.055	0.000	0.055
345	0.057	0.002	0.057	0.002	0.000	0.056	0.000	0.056
350	0.057	0.002	0.057	0.002	0.000	0.057	0.000	0.057
355	0.057	0.002	0.057	0.002	0.000	0.060	0.000	0.060
360	0.057	0.002	0.057	0.002	0.000	0.063	0.000	0.063
365	0.057	0.003	0.057	0.003	0.000	0.068	0.000	0.068
370	0.057	0.003	0.057	0.003	0.000	0.074	0.000	0.074
375	0.057	0.003	0.057	0.003	0.000	0.084	0.000	0.084
380	0.057	0.003	0.057	0.003	0.000	0.098	0.000	0.098
385	0.057	0.004	0.057	0.004	0.000	0.119	0.000	0.119
390	0.057	0.004	0.057	0.004	0.000	0.152	0.000	0.152
395	0.057	0.006	0.057	0.006	0.000	0.195	0.000	0.195
400	0.057	0.008	0.057	0.008	0.000	0.239	0.000	0.239
405	0.057	0.011	0.057	0.011	0.000	0.270	0.000	0.270
410	0.057	0.012	0.057	0.012	0.000	0.284	0.000	0.284
415	0.057	0.013	0.057	0.013	0.000	0.289	0.000	0.289
420	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
425	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
430	0.057	0.013	0.057	0.013	0.000	0.290	0.000	0.290
435	0.057	0.014	0.057	0.014	0.000	0.289	0.000	0.289
440	0.057	0.014	0.057	0.014	0.000	0.288	0.000	0.288
445	0.057	0.014	0.057	0.014	0.000	0.288	0.000	0.288
450	0.057	0.014	0.057	0.014	0.000	0.287	0.000	0.287
455	0.057	0.014	0.057	0.014	0.000	0.286	0.000	0.286
460	0.057	0.014	0.057	0.014	0.000	0.284	0.000	0.284
465	0.057	0.014	0.057	0.014	0.000	0.283	0.000	0.283
470	0.057	0.014	0.057	0.014	0.000	0.282	0.000	0.282
475	0.057	0.015	0.057	0.015	0.000	0.281	0.000	0.281
480	0.057	0.015	0.057	0.015	0.000	0.281	0.000	0.281
485	0.057	0.015	0.057	0.015	0.000	0.280	0.000	0.280
...
...
...
2475	0.054	0.104	0.054	0.104	0.000	0.137	0.000	0.137
2480	0.057	0.104	0.057	0.104	0.000	0.146	0.000	0.146
2485	0.059	0.099	0.059	0.099	0.000	0.140	0.000	0.140
2490	0.057	0.110	0.057	0.110	0.000	0.143	0.000	0.143
2495	0.050	0.108	0.050	0.108	0.000	0.151	0.000	0.151
2500	0.057	0.104	0.057	0.104	0.000	0.145	0.000	0.145

Table 5. Example of required ES-SO data file format (fabric material).

2.6.Data submission form

All materials should normally be measured using an appropriate spectrophotometer with integrating sphere. Integrated values of the optical properties need not be

submitted. Integrated values will be calculated by ES-SO as part of the review process in accordance with the procedures defined in EN 13363-1 [2].

In addition to the material data being submitted in the text format as detailed above a Data Submission form (see Appendix 1) containing the following information must be provided:

- Name of Material
- Date of test – number report and nr product test in report
- Test equipment used
- Analyst's Name
- Laboratory/Test house name and address

NOTE: for reports based on tests of the manufacturer, an additional check is needed; 5% of external accredited test lab reports will also be asked to submit during the peer review process, with a minimum of 3 products. When the external lab results differentiate from the lab results from the manufacturer all the products will be rejected. See procedure document 2.

In case the finished product manufacturer submits an application the reduced procedure with Appendix 2 may be followed.

3. Contact

The data submission form(s) appendix 1 or 2 to be sent to the ES-SO

Coordinator: ES-SO, Vilvoordelaan 126, 1930 Zaventem. Further information in support of the ES-SO Shading Product Properties Data submission and peer review process can be obtained from: coordinator@es-so-database.com

[NOTE: in case of deliveries by DHL or other Vilvoordelaan 170, 1930 Zaventem \(ES-SO attention Ann Van Eycken\)](#)

4. References

1. WIS, Window Information Systems, TNO, Delft, The Netherlands. *WIS Data Submission Procedure for Shading and Diffusing Components*, Rosenfeld J L R, Hutchins M G and Kilbey N B, May 2004.
2. EN 13363-1: 2007 - Solar protection devices combined with glazing - Calculation of solar and light transmittance - Part 1 : Simplified method

Note: EN 13363-1 to become ISO 52022/1 in 2017.

5. Use of Registered Collective Mark: see terms user regulation on ES-SDA website.



**APPENDIX 1 – ES-SDA Shading Product Properties Data Submission Form.
For each material/finished product one form with sample to be submitted
(at ES-SO, Vilvoordelaan 192, 1930 Zaventem, Belgium).**

Material or finished product (identification)

Company

Name and address: _____

Contact for data submission _____

Name: _____

Telephone: _____

Fax: _____

E-mail: _____

Membership status when submission (cross X)

Company confirms that it is a member of the national shading association:

Name association: _____

E-mail secretariat association: _____

Company confirms that it is not a member of the national shading association: _____

Explicit test by manufacturer or test by accredited external lab

Test from **accredited test lab**

Date of test _____

Number of test report _____

Number of product in test report _____

Test equipment used _____

Laboratory test house name and address _____

Data measured by **manufacturer**

Name: _____

Telephone: _____

Fax: _____

E-mail: _____

Data file submitted

File Name _____

Submission date _____

Component information

Type of product _____

Optical properties, 0.280 to 2.5 μm

Measurements made

Direct and diffuse / Total _____

Equipment used _____ Emissivity:

Measured / Standard value (specify) _____

Signature of contact for data submission

Name _____

Signature _____

Date _____

Attached documentation: 1 product sample A4 size or 2 samples A5 size for fabric or 250mm long for slats/louvers, to be sent to ES-SO vzw, Vilvoordelaan 19, 1930 Zaventem, Belgium



APPENDIX 2 - Application from the finished product manufacturer.
Confirmation that the data of the material manufacturer which are tested and published on ES-SDA database refer to the finished product name submitted (at ES-SO, Vilvoordelaan 192, 1930 Zaventem, Belgium or at coordinator@es-so-database.com).

Finished Product manufacturer company – name and address:

Contact (name):

Telephone: _____

E-mail: _____

System Identification:

And

Material manufacturer company - name and address:

Contact (name):

Telephone: _____

E-mail: _____

Confirm herewith that the submitted material used for the finished product has been tested and is published on the ESSDA website

Material

Identification: _____

Reference on the ES-SDA database (date and registration number)

Membership status when submission (cross X)

Company confirms that it is a member of the national shading association:

Name association: _____

E-mail secretariat association: _____

Company confirms that it is not a member of the national shading association:

Date and Signature

Date _____

Signature Finished Product manufacturer:

Signature Material manufacturer: