

# ES-SDA: validated shading data for new build and renovation

Shading has moved from a building component to a smart solar management concept for NZEB or renovated buildings (<http://es-so.com/new/314-es-so-position-paper-2015> ). Although shading is a mature building technology in Europe it is not adequately recognised for its energy saving properties.

**Keywords:** smart solar management; validated database; compliance EPB; overheating; shading properties; innovative shading; energy savings; indoor climate; NZEB

## Compliance to EPBD: a scattered image of “shading performance” in national calculation methodologies.

The EPBD has become a trigger for the industry to further promote the shading performance properties. Innovative materials such as external fabrics reaching up to 95% heat rejection, interior shading with low e or reflective coatings, maximisation of natural daylight, keeping the colour rendering and with glare control, are all energy benefits.

In the EPBD, the need for shading is mainly related to reduce the risk of overheating; a risk to be considered even more since the EPBD set the NZEB objective for new build by 2020 resulting in adding much more insulation materials to the building and the practice of airtight construction. See studies on overheating in buildings on <http://es-so.com/new/319-studies-on-overheating-in-buildings>.

However, when it comes to the building regulation compliance in the different countries, shading is often inadequately considered. To mention the performance for heat rejection, shading energy performance properties may only be considered for a defined default g-value,



**ANN VAN EYCKEN**  
Secretary General of ES-SO and Coordinator of the ES-SDA database



**DAVE BUSH**  
Board of Director of ES-SO and Chair ES-SDA. He is CEO of Hallmark Blinds in the London, U.K. and an active member of BBSA-U.K.

or only for its actual g-value, or equally be considered compliant for both default and actual g-values. The insulation properties are generally only considered in the building regulations for (roller) shutters.

## Quality in construction: reliable validated database as a necessary first step

With the involvement in the EU QUALICheck project dealing with compliance and quality regarding EPB legislation, ES-SO held a questionnaire among its member countries on the status of actual shading data. The conclusion was that only Belgium considers accredited data verified by an external lab for EPB compliance of actual shading values. In other EU countries, either the manufacturer can present their own data or can have the data measured by an external (accredited) lab. National databases for building products only exist in Belgium and France. Therefore, the decision to develop ES-SDA, the European Solar Shading Database was taken.



EU overview showing a wide variety of default values, in some countries considered as conservative negative values (e.g. Belgium), while in other countries very close to the actual market standard (e.g. Austria). Shading can be considered in g-tot or Fc. The g-tot means the solar factor of the glazing and the shading together; the Fc or shading factor is the ratio between the g-tot and the g-value of the glazing only.

Country	Shading in EPB	Methodology
Austria	Prevention of overheating	Fc = 0,15/0,25/0,50 (external/interpane/internal) or EN 13363 g-value
Belgium	Prevention of overheating	Fc = 0,50/0,60/0,90 (ext/interpane/int) or accredited value
Denmark	Yes	Actual g-value; automation/manual
Finland	Yes	
France	Detailed	At least 24 actual values; automation/manual
Germany	Yes, DIN 4108-2, 18599	Actual Fc value
Greece		
Hungary	Prevention of overheating	
Ireland	No	
Italy	Yes, UNI 11300 (13790)	Actual g-value, external
Malta	Yes	
The Netherlands	NEN 7120 (13790)	Fc = 0,30 (external)
Norway	Yes	
Poland	Yes	Default values
Portugal	Yes	
Spain	Yes	Actual g-value
Sweden	No (no EPB calculation)	Dynamic simulation
Switzerland	Yes	
UK	Only non-residential	Default g-value

## How to get a reliable validated database for solar shading properties

The designed ES-SDA procedure is compatible with the former existing European Window Information Systems - WIS database for glazing and solar protection devices (WIS has been developed in the beginning of 2000 as part of European Union funded activities).

The same principles are followed, meaning shading and shutter devices values are measured or calculated according to standardised methods. Testing must be done in independent labs with calibrated instruments according to Standards.

The verification of the submitted data follows in accordance with a peer review procedure executed by experts of the profession. Samples of the tested materials are also included in the verification process.

For each product, spectral optical data are given within a determined wavelength starting at least at 200 nm up to

2,500 nm taken at 5 nm intervals. Optical properties are designated on total normal hemispherical transmittance and reflectance surface for direct and diffuse components.

Fabric and material suppliers can submit their data but manufacturers can also submit data related to the finished product. Specific data on emissivity, conductivity, IR transmittance, Delta R that is not derived from the testing can be added.

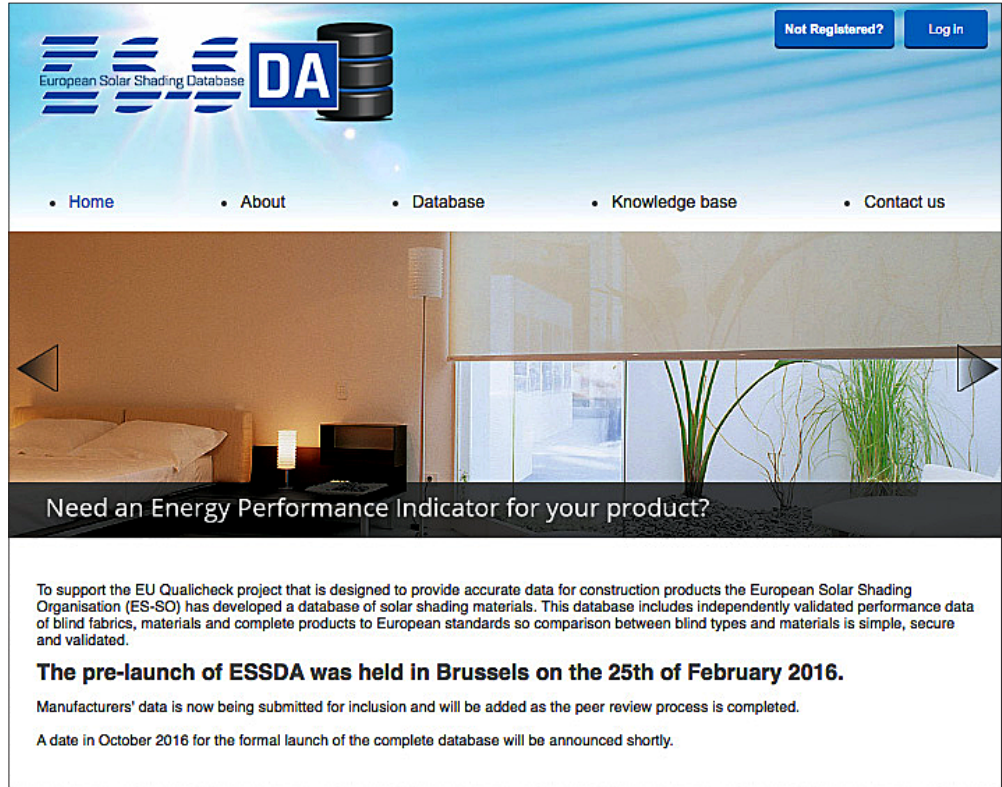
Integrated values will be calculated by ES-SO as part of the review process in accordance with the procedures defined in EN 13363-1 (soon to become ISO 52022-1). Tests from an external accredited lab (or external accredited labs) are required as a principle. As an exception, manufacturers who test their own products must prove they perform tests according to the same Standards as an accredited independent lab. In addition, 5% of the products are selected by ES-SO for testing by an external accredited test lab in order to compare with the manufacturers' test results.

Where the finished product manufacturer submits an application, a reduced procedure may be followed if they refer to the materials already present on the database.

**ES-SDA is a comprehensive single source of performance shading data with easy accessible reliable output for many usages**

ES-SDA will take performance data of fabrics and materials when combined with reference (typical) glazing and calculate a wide range of outputs such as U-values (heat retention) to Gtot (heat rejection) and Visible Light Transmittance known as Tvis.

ES-SDA will include data on all properties of shading and as it is web based it will be free to access anywhere. The database is searchable by supplier so it's easy to find data. There is an increasing demand from architects for accurate performance data and ES-SDA provides exactly that. Engineers are also using this data in building modelling to get an accurate calculation of



A web tool is provided to submit and to peer review the data. Results will be available on the ES-SDA website: <http://es-so-database.com/>

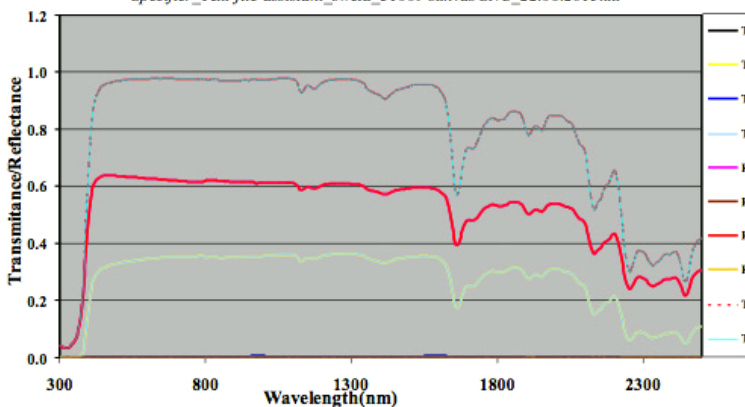
the benefits of solar shading, probably for the first time. There is also an international angle. ES-SO has been liaising with the team at Lawrence Berkeley National Laboratory who are working on a similar solution for North America.

As updating of the database will be key, ES-SO considers the ES-SDA European solar shading database as one of its essential cornerstones embedded in the objectives of the association. A training tool is being prepared for the industry to participate and to understand the importance of the shading performance values for their industry.

In a recent study commissioned by ES-SO in 2014, it was concluded that shading and shutters used on 75% of the windows in Europe could save 19% up to 22% energy consumption and CO2 emissions in buildings (depending on a split of energy cooling: heating of 30/70 up to 50/50). See the summary report \*.

To conclude, ES-SDA is conceived as a further step for the industry to have included shading and shutters as a reliable solution for energy savings, CO2 reduction and as a healthy indoor solution in renovation and new build. ■

Total near-normal hemispherical spectral reflectance and transmittance  
 Manufacturer: Schmitz-Werke GmbH + Co. KG - File Name: BBSA-Shade-Specifier\_Text-file-assistant\_swela\_31009\_sunvas\_SNC\_22.06.2015.txt



An example of spectral curves resulting from the calculation of the web tool..

\* [http://es-so.com/images/downloads/Downloads%20publications/ES-SO\\_\\_15-498\\_Extended-Executive-Summary\\_September-2015.pdf](http://es-so.com/images/downloads/Downloads%20publications/ES-SO__15-498_Extended-Executive-Summary_September-2015.pdf)