



**Windows as Renewable Energy Sources for Europe  
Window Energy Data Network**

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## **WIS Database. Links to Certification Schemes**

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# 1 Introduction

Due to the European Unions Directive on Construction products glass, glazing and windows have to be CE-marked when the relevant product standards have been adopted. The manufacturers in the area will have to follow the certification schemes required by the product standards to CE-mark their products. The final window product is typically produced on basis of a number of sub products from other manufacturers and therefore the window manufacturer will have to get certified information from the other manufacturers in the supply chain. In relation to the transfer and combination of energy performance data in the CE-marking scheme WIS can be very useful as it has the relevant databases and calculation procedures. The link between WIS and the CE-marking scheme is described in the following and an overview is presented in table 1.

## Single glass panes (non scattering)

The manufacturers of glass measure and declare the spectral near normal specular transmittance and reflectance of single glass panes according to the product standard EN 572-9 [ 1].

The manufacturers of coated glass measure and declare the spectral near-normal specular transmittance and reflectance of single panes as well as the IR emissivity of the coated side according to the product standard EN 1096 [ 2].

The manufacturers of glass and coated glass sends general and optical data to the WIS database *Glass and coatings* according to the data submission and verification procedures.

In WIS the integrated solar and visual near normal specular transmittance and reflectance can be calculated according to EN 410 [ 5] and shown for the single pane.

## Shadings and diffusing components

The manufacturers of shadings measure and declare the total, direct and diffuse normal-hemispherical transmittance and reflectance of the shading material (according to EN 13363[ 6] and “Data Submission Procedure for Shading and Diffusing Components”).

The manufacturers of shadings send general and optical data to the WIS database: *Shadings and diffusing components* according to the data submission and verification procedure.

In WIS the integrated solar and visual transmittance and reflectance can be calculated according to ISO 15099 [ 7] or EN 13363-2 [ 6] and shown for the shading separately for different solar incidence angles and tilt angles of horizontal lamellae.

The manufacturers of spacer profiles document their products by drawings and materials thermal conductivity. A detailed 2D-calculation is performed according to the procedure for calculating the equivalent thermal conductivity of a spacer profile box. For actual widths of the spacer profile but for standard dimensions of the spacer box and the sealant box the total thermal conductance of the edge construction is calculated.

The data for the spacer profile and edge construction is send to the WIS database: *Spacer profiles and edge constructions* according to the data submission and verification procedure.

## **Glass units**

The manufacturers of glass units can by use of WIS calculate the thermal and optical performance data for their products based on relevant data from the database: *Glass and coatings* according to EN 410 [ 5] and EN 673 [ 8].

The manufacturers can store the data for their specific glass unit products in the WIS database: *Transparent systems* and in this way declare the energy performance data of their products according to EN 1279-1 [ 3].

## **Window frames**

The manufacturer of window frames can find the thermal transmittance and the linear thermal transmittance of the assembly of the frame and the glass unit by looking up the values in EN 10077-1 [ 9] for typical frame and edge constructions or by use of detailed calculation according to EN 10077-2 [10]. The thermal transmittance (U-value) of the frame is only dependant of the frame profile. The linear thermal transmittance ( $\Psi$ -value) depends on the frame, the edge construction, the thickness of the glass panes and the U-value of the glass unit. However it is possible to calculate the  $\Psi$ -value for a number of these parameters and express it as a function of the thermal conductance of the edge construction, the thickness of the glass panes and the U-value of the glass unit by use of regression fit.

The manufacturers of window send general data and the thermal transmission data to the WIS database: *Window frames* according to the data submission and verification format.

## **Windows**

The manufacturers of windows can by use of WIS calculate the energy performance data of their whole window products based on the relevant data from the databases: *Transparent system, Spacer profiles and edge constructions* and *Window frames* according to EN ISO 10077-1 [ 9].

The manufacturers of windows can store the data for their specific window products in the WIS database: *Window Systems*. In this way the manufacturers can document the energy performance

data of window products according to the requirements in the window product standard prEN 14351 [ 4]. The requirements of documenting the energy performance data for actual dimensions and configuration of the windows is made easy to do by use of the WIS databases on the different components of the windows. Especially the functional expression of the linear thermal transmittance of the assembly of the frame and the glass unit makes it easy for the manufacturers as well as the building designers to use WIS to find the energy performance data of specific window products.

Table 1. Link between WIS and the CE-marking scheme.

Product	Product standard	Data input to WIS	WIS Database	Calculation Standard	Data output from WIS
Glass Coated glass	EN 572-9 EN 1096	Spectral transmittance and reflectance Emittance	Glass and coatings	EN 410	Integrated optical data of single pane
Solar shadings		Spectral nor.-hem. Transmittance, reflectance of material	Shadings and diffusing components	ISO 15099 EN 13363-2	Integrated optical data of shading
Spacer profile Edge construction		Drawing and material data. Equivalent thermal conductivity of spacer box Thermal conductance of edge construction	Spacer profiles Edge constructions		
Insulating glass unit	EN 1279-1	From database: Glass and coatings	Glass units	EN 673 EN 410	Thermal and optical transmittance
Glazing with solar shadings		From databases: Glass and coatings Shadings and diffusing components		EN 13363	Thermal and optical transmittance
Window frame profiles		Drawing and materials. Thermal transmittance and linear thermal transmittance for specific product or as function of glass unit and edge construction	Window frames		
Window	EN 13451	From databases: Glass units Edge constructions Window frames		EN 100077-1	Thermal and optical transmittance
Curtain walls	EN 13830	As for windows			

## **Product standards**

- [ 1] **prEN 572-9: Glass in building - Basic soda lime silicate glass product - Evaluation of conformity**
- [ 2] **prEN 1096: Glass in buildings - Coated glass**
- [ 3] **prEN 1279-1: Glass in Building - Insulating Glass Units, Date: December 1997**
- [ 4] **prEN 14351: Windows and external pedestrian doors - Product standard, Date: December 2002**

## **2 Calculation standards**

- [ 5] **EN 410: Glass in buildings - Determination of luminous and solar characteristics of glazing. March 1998**
- [ 6] **prEN 13363 –2 E: Solar protection devices combined with glazing — Calculation of total solar energy transmittance and light transmittance — Part 2: Detailed calculation method. February 2004.**
- [ 7] **ISO/FDIS 15099: Thermal Performance of Windows, Doors and Shading Devices - Detailed Calculations. Date: 18.07.2001**
- [ 8] **EN 673: Glass in buildings - Determination of thermal transmittance (U-value) - Calculation method. October 1997**
- [ 9] **EN ISO 10077-1: "Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 1: Simplified method." Date: July 2000**
- [10] **prEN ISO 10077-2: Thermal performance of windows doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames. Date: January 2003**