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THE ENERGY LABEL FOR WINDOWS IN MIDLE EUROPEAN CLIMATIC CONDITIONS

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Abstract: *Energy labeling of windows has been introduced in some Member States of European Union - for example Denmark, Finland, Slovakia and the UK. The UK BFRC scheme on window energy labeling has proved very efficient in communicating to the general public about the energy saving properties of high performance products thus contributing to their faster uptake. Slovak labeling system was introduced in 2008. The paper deals with main principles of energy rating system used in SLOVENERGOokno. National system for rating the energy efficiency of windows and is recognized within the Building Regulations as a method to show compliance for your replacement windows installation.*

Keywords: *Window, Glazing, Frame, Energy performance*.

All content should be written in English and should be in 1 column. Directive 2010/30/EU on the indication by labeling and standard product information of the consumption of energy and other resources by energy-related products provides a clear framework for the EU to introduce a Window Energy Labeling. The market for energy efficient windows has grown considerably in just 20 years, as has number and sophistication of products available to consumers. The most important technical advances have been new types of thin film coatings for glazings that increase the energy performance of the window. Selecting the right window for a specific building invariably requires trade-offs between different energy performance features, and with other non-energy issues.

New window technologies have increased energy benefits, thermal comfort, and have provided more practical options for consumers. A progression of innovations in recent years in today□s fenestration products are based on these technologies:

a. Multiple glazing unit structure;
b. Low- emissivity coatings;
c. Low-conductance gas fills;
d. Warm edge spacers;
e. Thermally improved sash and frame;
f. Solar control glazings and coatings;
g. Improved weatherstripping.

Low emissivity glasses have been specially developed to provide added insulation when used in double glazing units. New technologies that improve window performance and reduce wasteful energy use could improve local air quality and reduce greenhouse gas emissions. Thus, choosing energy efficient windows can have significance for the society as a whole as well as for the individual.

1. ANALYSIS OF THE REFERENCE BUILDING

In current building designs, energy standards are globally preferred. This means that the attention is paid primarily to the reduction of energy needs for heating and cooling. The task of developing procedure for determining energy performance of fenestration products, in specific climatic environments, is very important.

In order to stimulate and encourage the use of windows with improved energy performance, there is a need for developing an energy rating system that makes it easier to select the best windows for the actual climate.

The reference building was defined in accordance normalized thermal performance properties required in national thermal performance standard STN 73 0540 [1]. A reference building must be specified according rules in ISO 18292 [2].

2. MIDLE EUROPEAN CLIMATIC CONDITIONS ON THE EXAMPLE OF SLOVAKIA

The average effective solar radiation and average temperature difference can be determined via simulation calculations. Climatic conditions differ so greatly between summer and winter that the single value is not sufficient here. ISO 18292 [2] thus specifies two value for energy performance one for the heating and one for the cooling season. By STN EN ISO 13790 [3] with climatic conditions representing normalized values for Slovakia according national annex [4]:

h. required internal temperature for heating θint,set,H: 20,0 °C,
i. number of degree days for heating: 3 422 K.day,

j.required internal temperature for cooling θint,set,C: 26 °C,

k. number of degree days for cooling: 184 K.day,

l.internal heat capacity of the building Cm: medium – 165 000 J/K.

Gsol total amount of solar radiation for an average orientation during heating season (kWh/m2),

t duration of the heating season (h).

For orientation of solar radiation an average orientation is used. It is equals average between north, east, south and west. It is possible to specify the building and occupancy parameters for each climate zone. Energy need balance for heating season has the following form:

The A nad B values were derived for the climate data used for 36 locations. For Slovakia was estimated then one climate zone as the average. A and B parameters were derived for Slovakia:

A = 266,6

B = 96,6

A is a factor for the useable solar radiation, in kWh/(m2yr),

B is a factor for annual heating degree hours, in 1000 K.h/yr.

Energy need balance for cooling season has the following form:

For Slovakia were estimated parameters for summer season:

A = 36,0

B = 1,0

So Slovakia in this scheme is treated as a single climate zone, the decision was taken to retain single climate zone. The major benefit was that manufacturers and consumers would have wide rating for comparison purposes.

The rating and labeling system will help consumers, dealers, architects and other decision makers to choose the most energy efficient windows for their application. The rating and labeling is used in broadly the same way as the EU labeling for white goods. The labeling and registration process will drive the market to improve the products and reduce overall energy consumption. The project will achieve to improve the introduction of energy efficient windows. The aim is to provide a system for clear and unambiguous guidance to consumers and other purchasers on the most energy efficient product available to them. Provide a system that encourages the technical improvement of window available on the Slovak market to improve energy efficiency.