ENERGY BUILDING CERTIFICATION – INPUT DATA

Daniel Hlubeň, Ľubomír Beňa

ABSTRACT

This paper entitled Energy building certification– input data deals with the new standard EN 15 193 and input data entering the assessment.

1 INTRODUCTION

Energy efficiency and the reduction of CO_2 emissions are issues of big public interest. The Kyoto protocol had a large political influence on national and international legislation. In Europe a number of directives have been issued. The European Performance of Buildings Directive (EPBD) and its related standards are the most important of these directives. According to the aim of European Union to improve efficiency of electric energy consumption, several standards were published during last year. [1]

The main goal of these standards is to assess energy consumption. Buildings assessed according to this methodology are divided into several groups (A, B, …., G), according to the efficiency of the whole building. This assessment includes several fields and lighting is one of these fields.

2 ENERGY PERFORMANCE FOR LIGHTING

The main goal of this standard is to establish conventions and procedures for the estimation of energy requirements of lighting in buildings and to give a methodology for a numeric indicator of energy performance of building. [2]

At the beginning, it is necessary to write, that there are several methods, how to assess energy performance: Quick method, Comprehensive method, Measurement of lighting circuit. Figure 1.

The comprehensive method is used for building certification. In this article we would like to show, how to ease energy building certification in the field of energy consumption of lighting.

2.1 Software support

From the point of view of users, the usage of such software have to ease calculation, check values entered this software and tell user, if something is wrong. In this article we show, how to asses building.

2.2 Windows

According the standard EN 15 193, the following inputs have to be entered. The extent of input parameters depends on software, but the basics inputs are:

- Glass
- Width
- Height
- τ_{D65}
- k_1
- k_2
- k_3

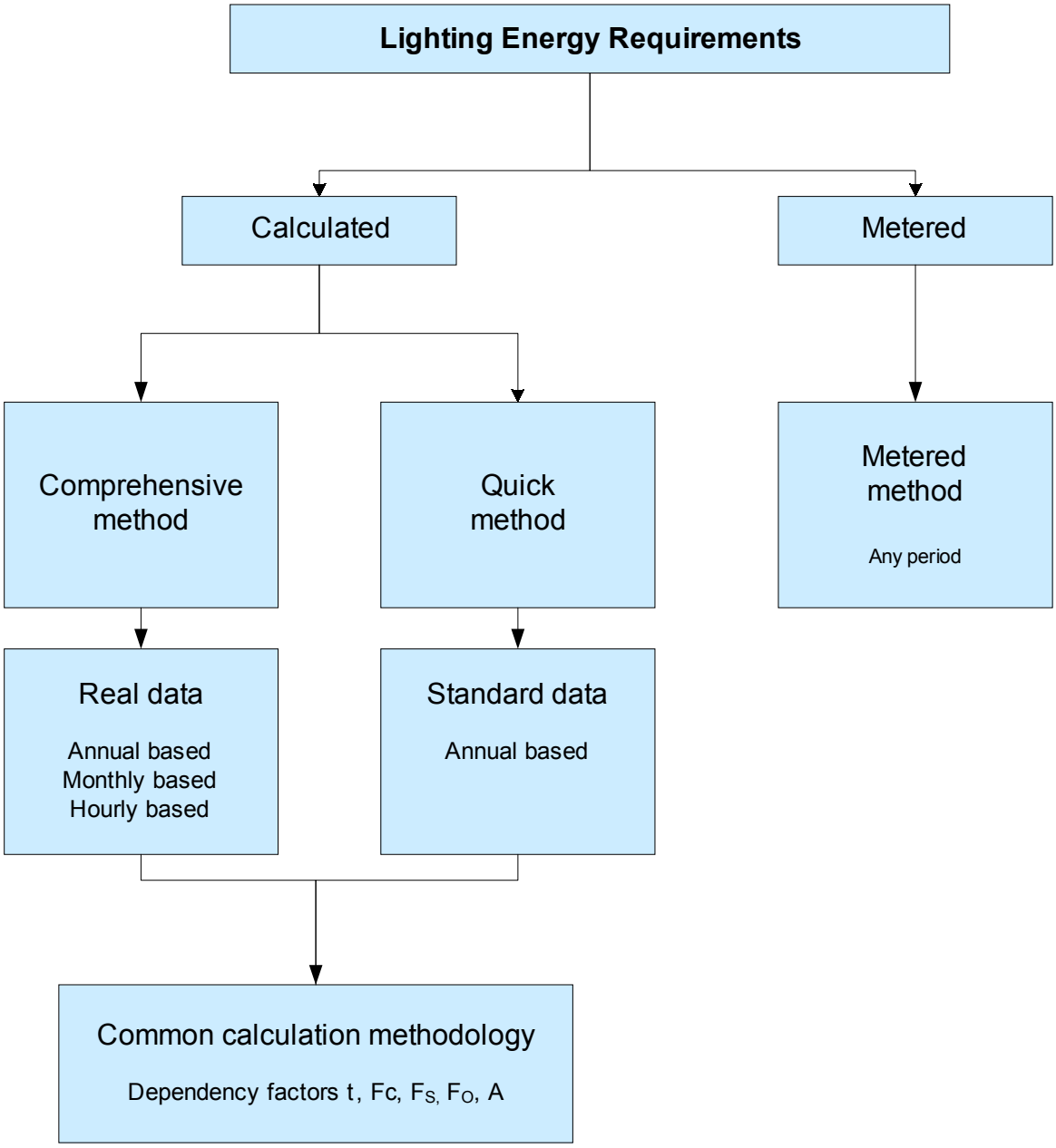

Figure 1 – Flow chart illustrating alternative routes to determine energy use

Table 1 – Example of the table – input data of windows

Designation	Producer	Glass	n	w_w	h_w	τ_{D65}	k_1	k_2	k_3
A		Double glass	2	1,5	1,5	0,82	0,75	0,8	0,78
B		Double glass	2	1,725	3,76	0,82	0,79	0,8	0,78
C		Double glass	2	4495,00	3525,00	0,82	0,8	0,8	0,78

2.3 Lights

- Name of the light (designation)
- P_i
- P_{ci}
- P_{ei}
- t_c

Table 2 – Example of the table – input data of lights

Des.	P_i [W]	Source	Počet	P_1 –power of one light source	P_{ci} [W]	P_{ei} [W]	t_c [h]
A	36		2	18	0	0	0
A1	96		3	32			
B	72	Lineárna žiarivka	2	36			
B1	72	Lineárna žiarivka	2	36			
BU	72	Lineárna žiarivka	2	36			

2.4 Roof lights and sheds

- Designation
- Producer
- Type
  - Roof light
  - Shed
- τ_{D65}
- other values (e.g. a_s, b_s, a_{Rb}, b_{Rb}, h_s, h_W,γ_G, γ_W, k_{Obl1}, k_{obl2}, k_{obl3}).

The extent of inputs depends on type of rooflight.

Table 3 – Example of the table – input data of roof lights and sheds

Des.	Type of construction	Composition	t_D65	a_s	b_s	b_{Rb}	h_S	□□$_w$	h_W	h_G	□□$_F$
A	Shed	Acrylate, 1,clear	0,92	1	1	0,9	0,9	30	0,5	0,48	30

2.5 Rooms

- Designation of room
- Width
- Height
- Depth
- Windows and roof lights or sheds, which are in room
- E_m
- MF – maintenance factor
- Type of light control system
- Type of room
- Obstructions
- Lights

Table 4 – Example of the table – input data of rooms

Room No.	Designation	Width (m)	Depth (m)	Height (m)	MF	Control system	Type of room	□□00V	□□00B	□□0VF
001	Strojovňa VZT	1	59,4	2,6	0,8	Manual ON/OFF	B1 – offices / storeroom			
002	Strojovňa VZT	1	38,2	2,6	0,8	Manual ON/OFF	B1 – offices / storeroom			
003	Nákladný výťah	1	5,55	2,6	0,8	Manual ON/OFF	B1 – offices / storeroom			
004	Vetracia šachta	1	3	2,6	0,8	Manual ON/OFF	B1 – offices / storeroom			

3 CONCLUSION

This article briefly described input data necessary for calculation. It can be seen, that there is large amount of input data entering the calculation and therefore calculation is not in the scope of this article. Simple calculation is shown in the following article „Energy building certification in practice (Hlubeň, Beňa, Balogh)“.

4 REFERENCES

[1] DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC
[2] EN 15193: Energy performance of buildings — Energy requirements for lighting
[3] EN 12464-1, Light and Lighting – lighting of workplaces – Part 1: Indoor work places
[4] MIHALÍKOVÁ, Jana: Problém výberu simulačného nástroja pre simulačný projekt. In: Novus scientia 2007: 10. celoštátna konferencia doktorandov strojníckych fakúlt technických univerzít a vysokých škôl s medzinárodnou účasťou: 20.11.2007 ÚVZ Herľany, Slovenská republika. Košice : TU, 2007. s. 392-396. ISBN 978-80-8073-922-5.

Author address:
Ing. Daniel Hlubeň
Department of Electric Power Engineering
Technical University of Košice
Mäsiarska 74
040 01 Košice, Slovak Republic
E-mail: daniel.hluben@tuke.sk
Tel: +421 / 55 / 602 355
Fax: +421 / 55 / 602 3552

Ing. Ľubomír Beňa
Department of Electric Power Engineering
Technical University of Košice
Mäsiarska 74
040 01 Košice, Slovak Republic
E-mail: lubomir.bena@tuke.sk
Tel: +421 / 55 / 602 3555
Fax: +421 / 55 / 602 3552

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