

Declaration of U_w values of windows based on reference size

Current practice is to declare in CE marking / DoP the U_w for a representative window of a window type (Table F.1 of EN 14351-1:2006+A2:2016) in size 1230 x 1480 mm according to Table E.1 No. 4.12 of EN 14351-1:2006+A2:2016. The value is determined by a Notified Body via either measurement in hotbox or more often via calculation according to EN ISO 10077-1 and -2. Some manufacturers (primarily SME's) are also using the option of tabulated values according to EN ISO 10077-1, Table H.1 or H.3 which are also based on reference size 1230 x 1480 mm.

Alongside the declared value, manufacturers are via note ^{c)} to Table E.1 of EN 14351-1:2006+A2:2016 obliged to be able to give accurate U_w values for the specific window in question, for use in more detailed energy performance calculations for the entire building. These values are calculated by the manufacturer based on input data on U_f and Ψ from a Notified Body (NB) and U_g from glass manufacturer's CE declaration.

Most EU's Member State building regulations (including incentives for renovation) are based on the current practice. This means that the requirement levels to U-values of windows stated in the regulations are chosen based on the reference sized window.

The present practice is developed to keep a good balance between

- I. credibility of the declared U_w ,
- II. costs and burdens for the manufacturers and
- III. needs of market players and regulators, and it has been in operation on EU level since 2006.

Different investigations have over the years been made to clarify if this practice lead to wrong decisions in the market in terms of energy performance.

In Denmark a study was made by the Technical University of Denmark DTU in 2008, [DTU Report](#). Even though the original purpose of this study was to evaluate if a window in reference size could be used as basis for an energy label scheme focusing on Energy balance it did also as a starting point evaluate if the ranking of different products U_w value in standard size would stay the same when the size was changed. The report is only available in Danish language, but looking in Table 2, U_w values for five different window constructions have been calculated in 4 different sizes and the ranking between the five stays the same for all the calculations.

Another study in Denmark (also only available in Danish) was made on behalf of the Danish Window Manufacturer Association by Danish Technological Institute in 2011 (attached as annex). In this study the effect of transoms/mullions and glazing bars as well as size was investigated. In the study three typical Danish windows (A, B and C) were included as well as three more niche products typically used for renovation projects of buildings where heritage considerations apply. These products are in the tables called F(1+1), F(1+2) and K(1+1).

Looking solely at the A, B and C windows the ranking of U_w among these three remains the same throughout all calculation examples. If the three niche products are considered as well F(1+1) and K(1+1) are changing place. It has though, to be kept in mind that especially these two products, where you have 2 single layers of glazing combined in two different ways, are rarely seen in the market and often also falling outside CE marking obligations. Due to the special nature of those two construction types these have been left out in the below table, summarizing the different window constructions U_w values for the nine window sizes/configurations.

The figures show that the U_w for Type A is always the lowest, followed by Type F(1+2) as number two, Type C as number three and Type B as number four. In the example Window 7 will be the one used for CE marking / DoP.

	Type A	Type B	Type C	Type F(1+2)
Window 8	0.77	1.33	1.30	1.17
Window 7	0.79	1.34	1.32	1.18
Window 4	0.96	1.49	1.46	1.29
Window 9	0.97	1.51	1.48	1.30
Window 1	0.99	1.52	1.49	-
Window 5	0.99	1.52	1.49	1.29
Window 6	1.00	1.53	1.50	1.29
Window 2	1.00	1.54	1.50	1.32
Window 3	1.02	1.55	1.52	1.32

In France the French window association, UFME, conducted a study in 2012 (attached as annex) with the purpose of investigating the impact of using reference size U_w values in the calculation of the energy performance of the entire building instead of specific values for the exact window sizes used. The investigation covered two single family houses where the main difference was the percentage of glazed area, and two apartment buildings – one with 7 flats and the other with 27. For both apartment buildings using reference size values are clearly on the safe side. For the single family houses the difference between the calculations based on reference size and those based on actual sizes are insignificant – in one case a bit on the unsafe side and the other a bit on the safe side.

Due to this insignificant difference, the study indicates that the declared U_w value based on reference size lead to a satisfying selection of windows and allow the design phase with satisfying accuracy to be based on the declared U_w -value of the current practice.

Departing from current practice towards a size-specific declaration of U_w value will significantly increase the costs for manufacturers as a NB will have to assess each and every size-combination that is manufactured. Since windows are generally manufactured to order, the possible combinations of width and height is endless and each window would be a separate product type.

We can clarify further in product standards that the size specific calculation done by the manufacturer must be based on the calculated U_f -values as are used for the declared U_w and must stem from the NB performing the U_w assessment for the reference size.

EuroWindoor is firmly in favor of maintaining the previous practice of standard sizes for the reasons given and the studies presented.

About EuroWindoor AISBL – EuroWindoor AISBL was founded as an international non-profit Association, in order to represent the interests of the European window, door and facade (curtain walling) sector. Our 20 national associations speak for European window, door and facade manufacturers that are in direct contact with consumers, and thereby having large insights on consumers' demands and expectations. We are at the forefront interacting with dealers, installers and consumers buying windows and doors, and the companies behind the associations cover selling all over Europe.

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