Draft method for the consideration of thermal bridges in the EPB-regulation in Belgium: summary description

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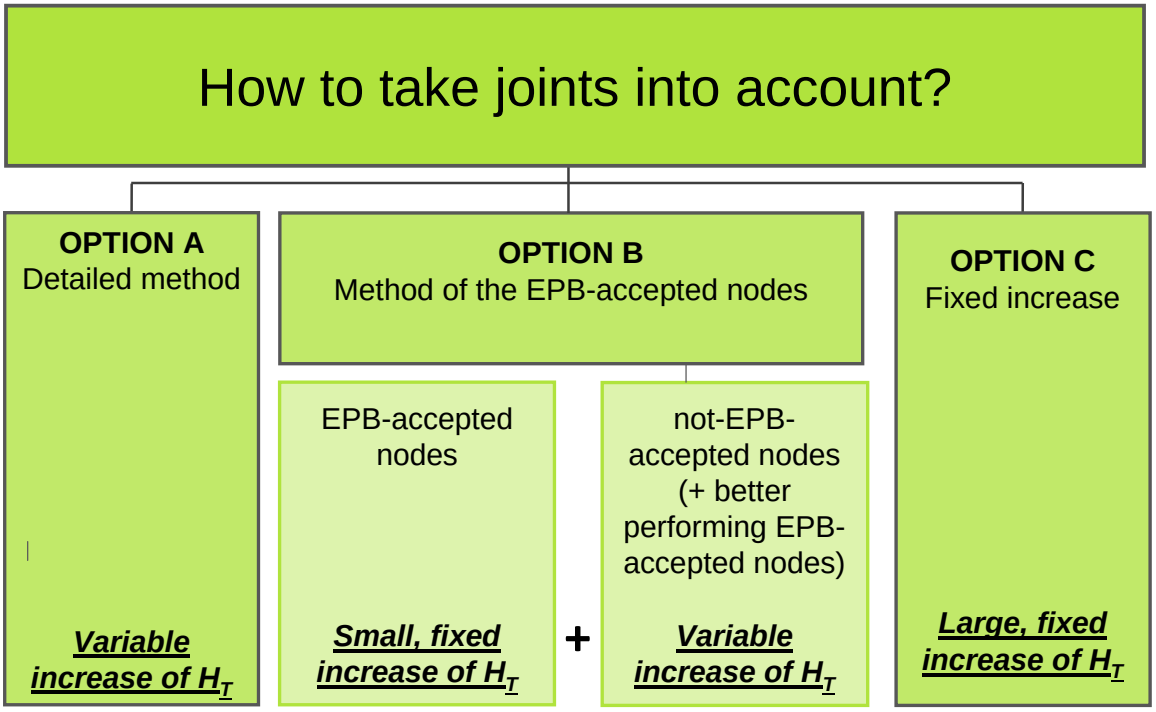
1 Introduction

In Belgium, the 3 regions are each responsible for the implementation of the EPBD on their own territory. Since 2006, the regions have been, each at its own pace, introducing gradually their own EPB-regulations. Until the spring of 2010, thermal bridges were not yet taken into consideration in the calculation procedures of the energy performance in any of the regions. But at the time of writing of this document (March 2010) a proposal of a consistent method for taking them into account has just been finalised. All 3 regions have said that they would apply this method, but none of them has already communicated a formal decision on when the method will come into force. A succinct description of the method is given here.

2 3 options

The method only concerns the so-called 'nodes', i.e. the joints between flanking elements and the punctual, non-repetitive penetrations. All other penetrations of the insulation layer must be taken into account in the U-value of the element. These component-related penetrations fall outside the scope of the method for the nodes, which is explained here.



Structure of the new Belgian approach for thermal bridging by nodes in the EPB-regulation

As illustrated in the figure, there are 3 main options:

1. **Option A**: this option corresponds to a detailed (classical) approach for taking into account thermal bridges. All linear and punctual nodes are considered individually by introducing their length (or number) and linear (or point) thermal transmittance. This option implies the

determination of all of these thermal transmittances, which is usually a time-consuming task. If a thermal transmittance is not known, default values are available (but these are rather negative).

2. **Option B**: this option is called the "method of the EPB-accepted nodes". It aims at simplifying the calculation work related to nodes while taking their impact into account and while encouraging their thermal improvement. It is the purpose that the method should be within easy reach of any designer, also the individual, non-specialised architect. All the construction nodes of the building are classified into two categories: EPB-accepted nodes and other nodes. A small, fixed increase of the average thermal transmittance is associated with the EPB-accepted nodes, while the other nodes must be accounted for individually (i.e. calculated in detail or using default value, as in option A). These other nodes thus lead to a variable increase of the average thermal transmittance (depending on their quality, length, etc.). If a node performs better than the limit value to be EPB-accepted, a bonus can be obtained by carrying out a detailed calculation for that node. A node is EPB-accepted if it fulfils some simple rules that are defined in the regulation. These are explained in more detail below. Basically, these rules aim at ensuring the continuity of the insulation barrier.

3. **Option C**: this option is chosen if one doesn't wish to pay any attention to the nodes. In this case, the calculation work is eliminated and the nodes may be executed in a poor thermal manner, but a large fixed penalty is applied on the average thermal transmittance. This must then be compensated for by a strong increase of the insulation of the different components (typically a more than 20% lower mean U-value).

3 EPB-accepted nodes

A node is considered to be EPB-accepted (in option B), if it satisfies 1 of the following conditions (see figure):

1. it conforms to at least one of the 3 basic rules (see below)

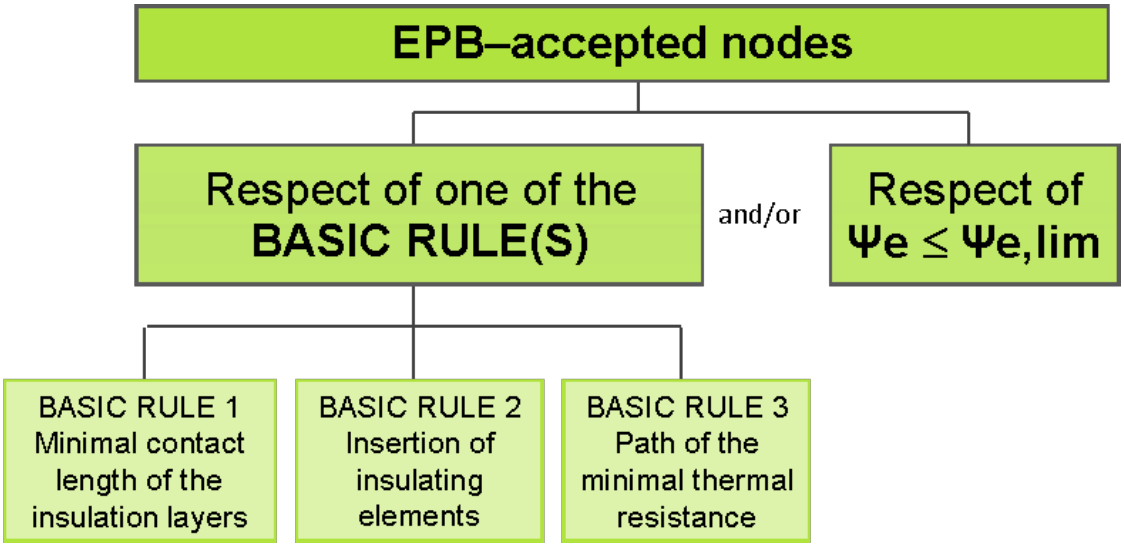
2. or its linear thermal transmittance is smaller than a limit value, which depends on the type of node (e.g. internal corners 0.15 W/mK; window and door perimeters: 0.10 W/mK; etc.)

As shown in the figure below, there are 3 basic rules:

1. **Basic rule 1**: Minimal contact length of the insulation layers. This rule simply requires that two insulation layers that connect with each other present a sufficient contact length, relative to the thicknesses of both layers.

2. **Basic rule 2**: Insertion of insulating elements. This rule applies to the case where two insulation layers are connected to each other using intermediate insulating elements. Requirements are defined for the thermal conductivity and the thermal resistance of the insulating elements, as well as for the contact length between the insulating elements and the adjacent insulation layers, and between the elements themselves.

3. **Basic rule 3**: Path of the minimal thermal resistance. Basically, this rule requires that the path that the heat follows from the inside while by-passing the insulation has a sufficient minimum length. It allows to take into account situations for which the only way to solve the thermal bridge is by sufficiently "wrapping up" the nodes with insulation, e.g. foundations bearing a heavy load.



Options for the recognition as EPB-accepted node in the new Belgian EPB-regulation

For each basic rule, particular specifications are given for the treatment of junctions around windows and doors.

Finally, simple default values (which on the average are fairly negatives) are defined for linear and punctual thermal transmittances. These can be used in options A or B and avoid that detailed calculations are necessary for all nodes, which may not be worthwhile for linear nodes with limited lengths or punctual nodes which are small in number.

4 References

At the time of writing of this paper, the new method has not yet been officially published.

But information on the draft method is available in an explanatory document and ppt slides (both in Dutch) on the website of the Flemish Energy Agency: http://www.energiesparen.be/epb/bouwknopen

5 Disclaimer

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