



# **BER Assessors – Dwellings Technical Bulletin**

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## **Contents:**

<b>1</b>	<b><i>DEAP Version 3.1.0 Release.....</i></b>	<b>2</b>
<b>2</b>	<b><i>Basements in DEAP in Existing Dwellings .....</i></b>	<b>3</b>
<b>2.1</b>	<b><i>Unheated Basements .....</i></b>	<b>3</b>
<b>2.2</b>	<b><i>Heated Basements.....</i></b>	<b>3</b>
<b>3</b>	<b><i>Existing Windows with Retrofitted Glass.....</i></b>	<b>5</b>
<b>4</b>	<b><i>Heating Systems in Highly Insulated Small Dwellings.....</i></b>	<b>6</b>
<b>5</b>	<b><i>Calculating Average Storey Height.....</i></b>	<b>7</b>
<b>6</b>	<b><i>Lighting in Partially-lit Dwellings .....</i></b>	<b>8</b>
<b>7</b>	<b><i>Declaration of Relevant Interests by Assessors.....</i></b>	<b>8</b>

The archive of previous bulletins is available on the [SEAI website](#).

# 1 DEAP Version 3.1.0 Release

DEAP Software Version 3.1.0 is now available for download from [http://www.seai.ie/Your\\_Building/EPBD/DEAP/Download/](http://www.seai.ie/Your_Building/EPBD/DEAP/Download/).

This release contains several new features:

- Upload of assessments from DEAP directly to the National Administration System (NAS)
- Download of published assessments from NAS directly to DEAP
- Generation of a new report file providing a summary of the dwelling and details of the Building Regulations Part L Technical Guidance Document conformance achieved
- Compatibility with Windows 7 and 64 bit Windows

The [release notes](#) on the website provide instructions which must be followed during the DEAP installation process. The release notes also provide details on the new features available in DEAP Version 3.1.0.

## Note regarding prior versions of DEAP (V3.0.0 and V3.0.1)

While BER assessments from prior versions of DEAP will continue to be accepted by NAS for the next number of weeks, it is planned that NAS will only accept assessments uploaded directly from DEAP Version 3.1.0 from the end of the third quarter of 2010. With immediate effect, user **login** in the prior DEAP versions will no longer be available. This disables the **MPRN lookup** and **BER number validation lookup** on the **Start** tab. These functions remain available on the NAS website <https://ber.seai.ie> and also in the new DEAP release. Prior versions of DEAP may also exhibit a security alert when the **Table 4** lookup function in the **Distribution System Losses and Gains** tab is accessed. This warning is known to SEAI and it is safe to click “Yes” and proceed with the Table 4 Lookup function.

## Troubleshooting and installation issues

The [release notes](#) have been updated to include “Appendix A: Issues and Troubleshooting” to address commonly asked questions and known issues within DEAP 3.1.0.

Issues now addressed in Appendix A of the release notes include:

- Instructions on DEAP Version Download using Google Chrome browser;
- Instructions on DEAP Version Download using Mozilla Firefox browser;
- Entering window U-Values < 1.0W/m<sup>2</sup>K:

If DEAP users encounter a window with accredited test data for U-value and solar transmittance in a dwelling, this accredited data can be entered as per the following diagram:

Click here if you want to enter a user defined UValue and solar transmittance value <input checked="" type="checkbox"/>	
U-value [W/m <sup>2</sup> K]	0.9
Adjusted U value [W/m <sup>2</sup> K]	0.87
Solar transmittance	.55
Frame factor	0.7

It is likely that DEAP Version 3.1.0 will close down (without warning) due to an internal error in cases where the entered non-default window U-value is < 1W/m<sup>2</sup>K.

This can be avoided as follows:

1. The user wishes to enter a window U-value of “0.x”
2. In the U-value box for the window in DEAP, enter “x”
3. Then enter “.” To make the U value “0.x”.

For example, when entering a window U-value of “.9”, first enter “9” and then change the entry to “.9”. The window U-value <1 is then entered without further issues. For any assistance on this matter, please contact the BER helpdesk.

## 2 Basements in DEAP in Existing Dwellings

This section discusses the treatment of heated and unheated basements in BER assessments for existing dwellings. In particular, examples are provided in relation to the relevant heat loss surfaces and the impact on dwelling floor area.

### 2.1 Unheated Basements

An unheated basement is not considered part of the Total Floor Area of the dwelling in a BER assessment. The ground floor above the unheated basement is a heat loss area, i.e. the Assessor must account for heat lost from the dwelling down through the ground floor into the unheated basement.

In DEAP, the Assessor selects “Ground Floor – Above Unheated Basement” from the list of possible floor types. In cases where there is insufficient information to calculate the actual U-value of the heat loss ground floor above the unheated basement, the Assessor must use the defaults provided by DEAP. The example below is of a floor above an unheated basement. It was built in 1979 having an area of 56m<sup>2</sup> and an exposed perimeter of 22m.

Building element characteristics

Floors | Roofs | Walls | Doors | Windows | Heat loss results

Floor detail entry

Floortype	Ground Floor – Above Unheated Basement	
Description	Ground floor of house, above unheated basement	Age Band 1978 - 1982
Underfloor heating	<input type="checkbox"/>	
Area [m <sup>2</sup> ]	56.0	
Exposed Perimeter [m]	22.0	PA ratio 0.4
U-Value [W/m <sup>2</sup> k]	0.73	AU [W/k] 40.88

Add

Figure 1.1 - An Unheated Basement in DEAP

### 2.2 Heated Basements

If a basement is heated and consists of habitable rooms then it is included in the Total Floor Area of the dwelling in the DEAP assessment. The ground floor above the heated basement is not a heat loss area as it is not above an unheated area. Heat is lost through the walls and floor of the basement as they are exposed, so the U-values of the basement walls and floor must be calculated and accounted for in DEAP.

The following cases may arise:

- Basement fully underground
- Basement partially underground

#### Heated Basement Fully Underground

If the basement floor and walls are fully underground then the Assessor selects, “Heated Basement – walls exposed to ground” when accounting for the heat loss areas of the basement under “Building elements – Floors” in DEAP. In this case the Assessor must provide:

- the floor area between the basement floor and the ground below (55m<sup>2</sup> in this example);
- the area of the basement wall exposed to ground (75m<sup>2</sup> in this example);
- the exposed perimeter of the **basement floor** (22m in this example);
- the Age Band of the basement.

DEAP then selects a default U-value which is overwritten by the Assessor when a non-default U-value is available.

Building element characteristics

Floors | Roofs | Walls | Doors | Windows | Heat loss results

Floor detail entry

Floor type: Heated Basement - walls exposed to ground

Description: Basement walls and floor

Age Band: 1994 - 1999

Underfloor heating:

Area [m<sup>2</sup>]: 55.0 (floor)      75.0 (wall exposed to ground)

Exposed Perimeter [m]: 22.0      PA ratio: 0.4

U-Value [W/m<sup>2</sup>K]: 0.38      AU [W/K]: 49.40

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Figure 1.2 - A Heated Basement Fully Underground in DEAP

### Heated Basement Partially Underground

In cases where some of the basement's outer walls are below ground, and some are above ground, it is necessary to calculate the average basement depth. Average basement depth means the average depth of the internal basement floor level below the external ground level.

As stated on page 88 of the [DEAP Manual](#), if the average basement depth is *greater than or equal to* 1.2m then the floors and walls which are exposed to ground are entered under "Building Elements – Floors".

However, the walls (or sections of walls) of the heated basement that are above ground are always entered under the "Building Elements - Walls" section of DEAP.

As an example, Figure 1.3 shows a detached house with a heated basement. The external ground is 1.3m above the basement floor level on all sides of the house giving an average basement depth of 1.3m.

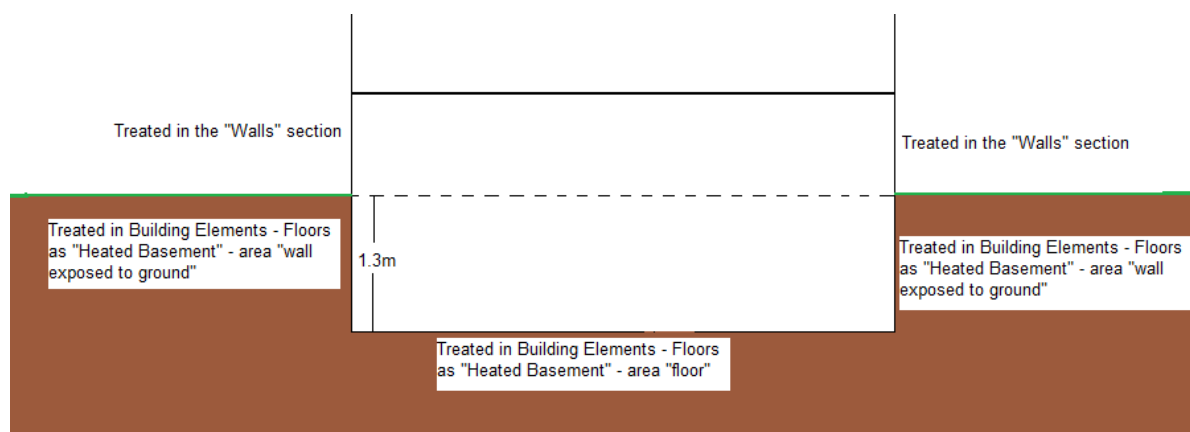


Figure 1.3 - A Heated Basement Partially Underground – Average Basement Depth greater than 1.2m

Floors and Walls exposed to ground are entered in "Building Elements – Floors". Walls above ground are entered in "Building Elements – Walls".

If the average basement depth is *less than* 1.2m then the basement floor is treated as a solid ground floor and the basement walls are treated as normal walls exposed to air under "Building Elements – Walls".

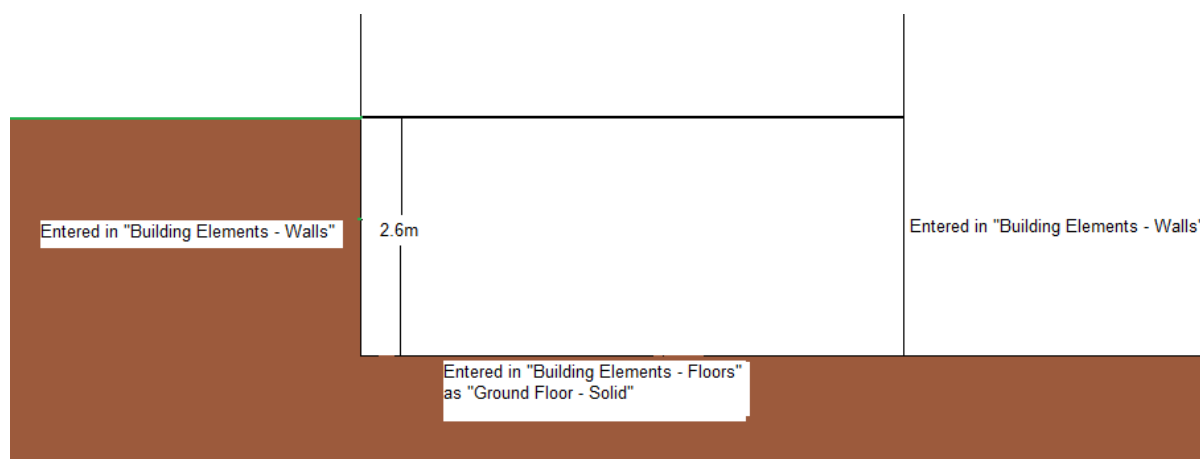
As an example, consider a heated basement in a detached dwelling with floor area 7m by 10m.

At the back of the house the external ground level is 2.6 metres above the basement floor.

At the sides and front of the house the external ground level is at the basement floor level, i.e. the walls are above ground, see Figure 1.4.

The dimensions of the basement walls are:

- back wall = 10m wide \* 2.6m high (below ground)
- front wall = 10m wide \* 2.6m high (above ground)
- each side wall = 7m wide \* 2.6m high (above ground)



**Figure 1.4 - A Heated Basement Partially Underground – Average Basement Depth less than 1.2m**

Basement floor entered in "Building Elements – Floors" as "Ground Floor – Solid".

All walls entered in "Building Elements – Walls".

The average of the basement depth is weighted by the wall length,

$$\text{Ave. Basement Depth} = \frac{(10 * 2.6) + (7 * 0) + (7 * 0) + (10 * 0)}{(7 + 10 + 7 + 10)} = 0.76\text{m.}$$

This is less than 1.2m so,

- the basement floor is treated like a standard solid ground floor, and,
- the basement walls are treated as standard walls exposed to air,

with the appropriate default U-values for that Age Band if defaults are being applied.

### Heated Basements in Semi-detached or Terraced Dwellings

When surveying a semi-detached or mid-terrace dwelling with a heated basement, it may not be possible to examine the adjoining dwelling to establish whether a basement is present.

It is likely that the adjoining house has a basement and that unless proven otherwise, the adjoining basement should be assumed to be unheated.

If the adjoining basement is unheated or assumed to be unheated, then the basement party-wall is treated as a heat loss basement wall. If the adjoining basement is known to be heated, then there is no heat loss through the basement party-wall.

The party wall is always included in the average depth calculation for the heated basement, regardless of whether the adjoining basement is heated or unheated.

## 3 Existing Windows with Retrofitted Glass

When an Assessor encounters retrofitted / upgraded glass in an existing window frame, they will most likely need to resort to the default window U-values in DEAP.

Non default values are used where there is sufficiently evidenced information to carry out a calculation to EN10077-1. It is unlikely that EN10077-2 (detailed calculation) or EN12567 (measurement) would be feasible in this case.

Also, to use a non default U-value, an Assessor would require a certified solar transmittance value (covered in the DEAP manual Table 6b and the March 2009 Technical Bulletin).

## 4 Heating Systems in Highly Insulated Small Dwellings

Section A3.2 of the DEAP manual provides guidance on selecting the primary and secondary heating systems in existing dwellings with inadequate heating systems, i.e. dwellings in which one or more habitable rooms have no heat emitters. Generally speaking, rooms without heaters are assumed to be heated by electric heaters.

An exception is made in the case of small, highly-insulated dwellings where the Design Heat Loss of the entire dwelling is less than 3kW, as outlined in section A3.3 of DEAP. In such cases a single heat emitter, e.g. a stove or a gas-fire, situated in the main room is assumed to be sufficient to heat the entire dwelling.

As an example, consider a small cottage insulated according to Building Regulations Part L, 2008. The cottage has a living room, kitchen/diner and two bedrooms (4 habitable rooms). The only heating is provided by a solid fuel stove in the living room. As such 25% of the habitable rooms are actually heated. Normally the guidance given in DEAP manual Section A3.2 would be appropriate but as this is a well-insulated dwelling it is necessary to see if the guidance in A3.3 applies.

The Design Heat Loss (DHL) is calculated by multiplying the Total Heat Loss of the dwelling by a reference temperature-difference, taken to be 22°C. The Total Heat Loss of the dwelling is taken from the Heat Loss Results page of Building Elements. DEAP includes heat lost through the fabric and ventilation heat losses (such as that associated with the open flue connected to the stove) in the Total Heat Loss figure.

Building element characteristics

Floors	Roofs	Walls	Doors	Windows	Heat loss results
Summary: Windows					
Total area [m <sup>2</sup> ]	8	Glazing ratio	0.056		
Heat loss [W/K]	12.7				
Effective collecting area [m <sup>2</sup> ]	2.44				
Summary: Building fabric					
Total element area (includes glazed area) [m <sup>2</sup> ]	199.85				
Total heat loss via plane elements [W/K]	74				
Factor for thermal bridging [W/m <sup>2</sup> K]	0.08				
Fabric heat loss [W/K]	90				
Total heat loss [W/K]	117	Per m <sup>2</sup> [W/K m <sup>2</sup> ]	1.96		

So in this case,

- Design Heat Loss = Total Heat Loss x 22,
- Design Heat Loss = 117 x 22 = 2574 W = 2.574 kW

The Design Heat Loss for the dwelling is less than 3kW as required by A3.3.

In this case the solid fuel stove is taken to be the Primary Space Heating System and there is no Secondary Space Heating System.

If the Design Heat Loss was greater than 3kW then the guidance in A3.2 applies, namely that Direct Acting Electric heaters are the Primary Space Heating System and the solid fuel stove is the Secondary Space Heating System.

## 5 Calculating Average Storey Height

Storey Height is defined in Section 1 of the DEAP manual as “the total height between the ceiling surface of a given storey and the ceiling surface of the storey below”. In some dwellings this height may vary across a single storey, e.g. if an extension of different ceiling height has been added. In cases such as this the area-weighted average storey height must be calculated.

As an example, take a two-storey detached house built in the 1940s to which a single storey ground floor extension was added in 2000. An Assessor carried out a BER survey of the dwelling and noted the following:

<i>Ground Floor – Original Section:</i> Area: 42m <sup>2</sup> Floor-to-ceiling Height: 2.7m	<i>Ground Floor - Extension</i> Area: 16m <sup>2</sup> Floor-to-ceiling Height: 2.4m
<i>First Floor – Original Section</i> Area: 42m <sup>2</sup> First floor ceiling has flat and sloped sections – see below	Thickness of intermediate floor: Could not be measured

The area-weighted average height of the ground floor,  $h_{AVE}$ , must be calculated using the formula,

$$h_{AVE} = \frac{h_1 * A_1 + h_2 * A_2}{A_1 + A_2}$$

where,

$h_1$  = storey height of the original part of the ground floor = 2.7m,

$A_1$  = the Area of the original part of the ground floor = 42m<sup>2</sup>,

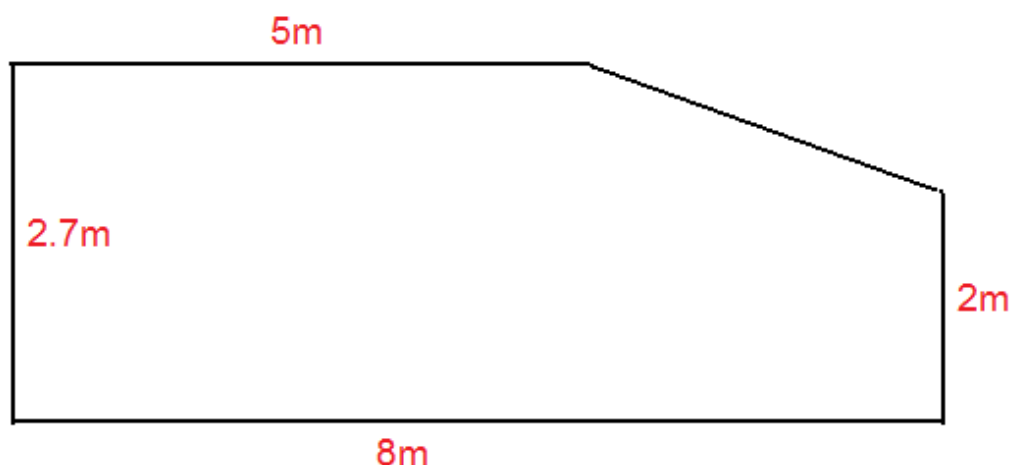
$h_2$  = storey height in the ground floor extension = 2.4m,

$A_2$  = the Area of the ground floor extension = 16m<sup>2</sup>.

So, the average storey height of the ground floor is,

$$h_{AVE} = \frac{(2.7 * 42) + (2.4 * 16)}{(42 + 16)} = 2.62\text{m.}$$

Below is a cross section of the first floor drawn by the Assessor,



The average height of the section with the flat ceiling is 2.7m.

The average height of the sloped section is,

$$(2.7 + 2)/2 = 2.35\text{m.}$$

The average height of the whole storey is,

$$h_{1st} = \frac{(5 * 2.7) + ((8 - 5) * 2.35)}{8} = 2.57 \text{ m.}$$

(In this case the average is weighted by the width of the section rather than the area but either method would give the same result.)

From the definition of storey height, we must remember to include the thickness of the intermediate floor. The Assessor noted that this could not be measured so the default value of 0.25m is used (from Section S4 of the DEAP manual). Thus, the average storey height of the first floor is,

$$h_{1st} = 2.57 + 0.25 = 2.72\text{m.}$$

In cases where the Assessor first calculates the volume of the storey, the average height can also be derived by dividing the volume of the storey by the storey floor area.

## 6 Lighting in Partially-lit Dwellings

The calculation of the electricity demand for lighting in a dwelling, as explained in Appendix L of the DEAP manual, assumes that the dwelling is fully lit, i.e. that there are fixed lighting outlets in every room.

In *partially-lit* dwellings, where fixed lighting is not present in every room, an adjustment must be made to calculate the electricity demand for lighting correctly.

To calculate the lighting demand in a partially-lit dwelling,

- the percentage of low energy fixed lighting outlets is calculated as before;
- the result is multiplied by a correction factor:

$$\text{Correction Factor} = \text{Number of rooms with fixed lighting outlets} / \text{Total number of rooms}$$

As an example, take a dwelling with 10 rooms. 6 rooms have fixed lighting, 4 rooms have no fixed lighting. In the 6 rooms that have fixed lighting there are a total of 12 fixed outlets; 7 of these contain low energy bulbs.

Percentage of low energy fixed lighting outlets in the 6 rooms with fixed lighting =  $(7/12) \times 100 = 58.3\%$

This must be adjusted to account for the fact that only 6 of the 10 rooms have fixed lighting.

Percentage of low energy fixed lighting outlets =  $58.3\% \times (6/10) = 35\%$ .

This correction only needs to be made in dwellings that are partially lit by fixed lighting. In all other cases the usual calculation applies.

In all cases where Assessors carry out supplementary calculations in completing BER assessments, the calculations should be kept on file with the assessment records.

## 7 Declaration of Relevant Interests by Assessors

An Assessor who has other business interests, e.g. as a supplier of building products or services, is not prohibited from carrying out BER assessments. However, the BER assessment must be carried out in an independent and transparent manner and in compliance with all of the requirements in the Code of Practice. In particular, an Assessor is obliged under Section 11 of the Code of Practice "to disclose to clients....any and all direct or indirect commercial connections which he/she or his/her principal may have to manufacturers, suppliers or other third parties who may be engaged directly or indirectly by a client arising from recommendations in the advisory report". Note that, as detailed in Section 6 of the Code of Practice, there are scenarios in which an Assessor is prohibited from carrying out a BER assessment on a dwelling. Further details on disciplinary procedures in relation to the BER Assessor's Code of Practice are detailed in the March 2010 Technical Bulletin.