

# **BER Assessors – Dwellings Technical Bulletin**

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

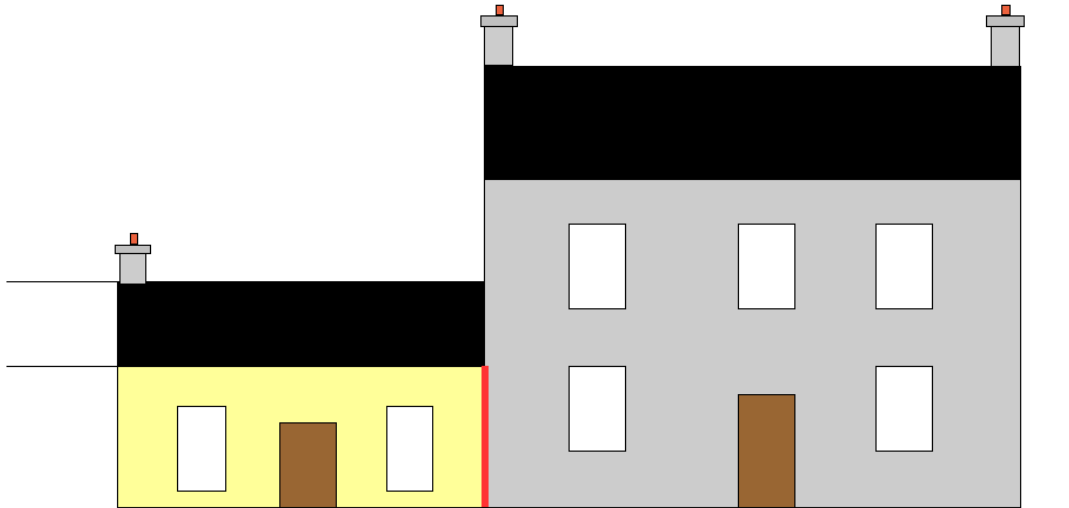
This technical bulletin addresses a number of issues recently encountered by the BER audit team and the BER Helpdesk:

- Dwelling type classification ;
- Partially sheltered sides: obstacles lower than the required height;
- U-values of filled cavity walls;
- Draught-stripping calculation;
- Selecting the correct efficiency for solid fuel appliances.
- Warm air heating systems and mechanical ventilation.

## 1 Dwelling type classification

The classification of a house as detached, semi-detached or terraced depends on how it adjoins the neighbouring buildings. A side is considered attached if more than half of its area adjoins a heated space. Otherwise it is not attached for the purposes of identifying dwelling type.

As an example, consider the BER assessment of the grey two-storey house below:

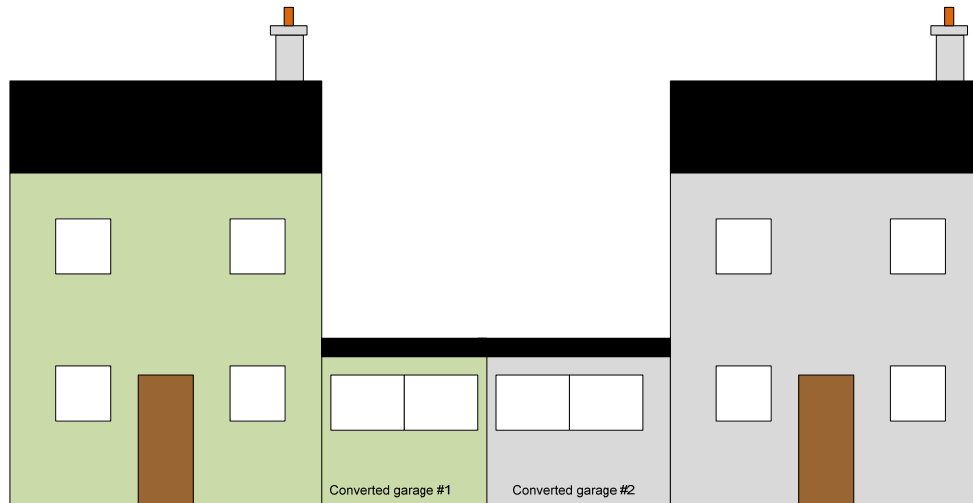


The grey two-storey house adjoins a single-storey house. The attic in the yellow single storey house is unheated. Less than half of that side of the grey two-storey house adjoins the heated space (yellow) so that side is considered to be unattached for the purposes of identifying the dwelling type. The other side of the grey two-storey house is unattached in this case so the dwelling type is 'Detached'.

Even though the grey house is specified as 'Detached', it can still be assumed that there is no heat loss through the area of the party wall between the grey house and heated yellow house (marked in red in the diagram).

For the yellow single-storey house, both sides are fully adjoining heated spaces so the dwelling type is 'Mid-terrace'.

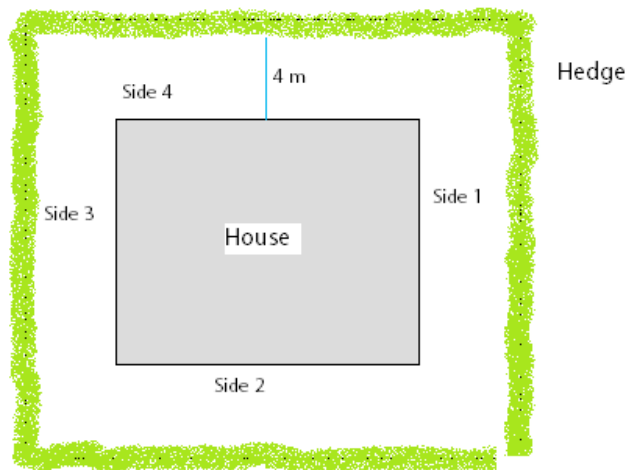
In the following example, both houses were originally constructed with adjoining garages. Both garages were converted to habitable heated spaces and are less than half the height of the original dwellings. In addition, both houses were constructed as detached houses and should be entered as detached houses in DEAP.



## 2 Partially sheltered sides in DEAP

The September 2010 technical bulletin details the combination of two partially sheltered sides to count as one sheltered side. In those examples the obstacles were tall enough and close enough to the dwelling to meet the criteria in the DEAP Manual Section 2.5, but not wide enough to fully shelter a side of the dwelling. The *combined* width of the two obstacles was sufficient to count the two partially sheltered sides as one sheltered side.

This approach can also be applied to the combination of obstacles which are close enough and wide enough but not tall enough. For example consider a two storey detached house with the upstairs ceiling at a height of 5.5 metres. The house is surrounded on all sides by a 3-metre tall hedge that is 4 metres from the house.



If two sides are taken together, the *combined* hedge height is 6 metres which is tall enough as it is greater than the dwelling height. So, sides 1 and 2 count as a single sheltered side, as do sides 3 and 4. In total the house has 2 sheltered sides in DEAP.

### **3 U-value of filled cavity walls**

In cases where an existing cavity wall has been filled with insulation, the U-value may be calculated based on the default U-value for the original wall as detailed under DEAP Manual Table S3. This requires the following:

- the original default U-value of the wall – taken from Table S3;
- the thickness of the newly added insulation – as measured and documented by the BER Assessor or as documented by the Contractor who installed the cavity-fill insulation;
- the thermal conductivity of the new insulation material used to fill the cavity – taken from a certified data source as explained in the April 2009 Technical Bulletin.

Alternatively the U-value may be calculated in full using the thermal conductivities and thicknesses of the different layers in the wall.

If the information above is unavailable, then the wall U-value should be taken from the appropriate default for a filled cavity wall in Table S3 in the DEAP manual.

### **4 Draught-stripping calculation**

In calculating the ventilation heat loss of a dwelling it is necessary to estimate the level of infiltration of air through the dwelling structure. The most accurate way to do this is using an air pressurisation test. Data about the dwelling structure gathered during the BER survey is used where the air pressurisation test has not been carried out.

This dwelling structure information includes the “Percentage of windows and doors draughtstripped” which is used to estimate air infiltration through gaps between the operable part of a window and the surrounding window frame.

In practice, it is unnecessary to measure the perimeter or area of each operable section when determining the percentage draught stripping. The Assessor may identify the number of openings with draught stripping and divide this by the total number of openings in the dwelling. Openings include operable windows, doors and attic hatches between the dwelling and unheated spaces or open air.

For windows it is likely that double-glazed windows, triple-glazed windows and single glazed windows with secondary glazing have draught-stripping.

The percentage of windows and doors draughtstripped may then be calculated based on the number of openings in the dwelling.

## 5 Efficiency data for solid fuel appliances

The BER auditors have encountered assessments where the fuel used by a heating appliance is not the same as the fuel specified in test data or the HARP listing for the appliance. For example, the appliance was tested with smokeless fuel but in DEAP is to be specified as using solid multi-fuel. Using a different fuel can affect the efficiency.

The following guidance outlines the steps that should be taken:

- 1) If the appliance fuel type as per DEAP 10.3.3 matches the test data fuel type then the gross efficiency is used if it is shown on the test certificate or on HARP.

**Example**

HARP listing for wood fuel stove: gross efficiency 73%.

If the stove uses wood fuel in DEAP, then the efficiency is entered as 73% in DEAP.

- 2) If the appliance fuel type as per DEAP 10.3.3 matches the test certificate fuel type but the test certificate only shows the net efficiency then the net/gross conversion described in Appendix E must be applied (see Table E4).

**Example**

Test certificate for wood fuel stove: net efficiency 77.2%.

If the stove uses wood fuel in practice then the efficiency used in DEAP is given by,  
Gross efficiency =  $77.2 \times 0.91 = 70.25\%$ .

- 3) If the appliance fuel type as per DEAP 10.3.3 is solid multifuel then the Assessor should consider the average efficiency from available solid fuel test data. This may be a single efficiency for a single fuel type or multiple efficiencies for multiple fuel types. The data could be from HARP or from other accredited sources. If the test data specifies gross efficiencies, such as on HARP, then the average of these can be used in DEAP. If the test data efficiencies are net, then these are averaged and the solid fuel net/gross conversion of 0.94 described in Appendix E must be applied.

**Example**

The fuel type of the stove in DEAP is solid multifuel.

Test data for coal, anthracite and manufactured smokeless fuel are available specifying gross efficiencies of 75%, 76% and 72% respectively.

The efficiency used in DEAP =  $(75 + 76 + 72)/3 = 74.33\%$ .

## 6 Warm Air Heating System with MVHR

Older warm air heating systems have their own distribution system but in more recent installations warm air systems are frequently combined with a Mechanical Ventilation system with Heat Recovery. For example, a boiler system may feed a heat exchanger at the mechanical ventilation inlet rather than feeding radiators.

The heat recovery system data is entered in the ventilation tab in DEAP in the usual way. This caters for the ventilation aspect and the power consumption of the heat recovery system fans. It is possible to use non defaults for the MVHR parameters by following the guidance outlined [here](#).

The boiler data is entered as normal, using the efficiency from HARP for example. In the Distribution System Losses & Gains tab, "Warm air heating system present" is not specified as the warm air heating fan power is entered through the heat recovery system in the DEAP ventilation tab. As per DEAP table 4f note (d) the warm air heating fan power usage is actually that of the MVHR in this case. The responsiveness category is 1 in this system type. It should be assumed that a central heating pump is required to pump water from the boiler to the MVHR heat exchanger unless you can demonstrate otherwise.

The following example shows the relevant DEAP data entries. The sample dwelling shown has an oil boiler with a central heating pump providing hot water to a heat exchanger in a heat recovery unit inlet. The heat recovery unit test data is taken from SAP Appendix Q in this case.

**DEAP Ventilation Tab: MVHR entry.** The specific fan power accounts for the electricity required to distribute the warm air from the heat recovery unit (and boiler heat exchanger in this case) to the dwelling space:

The screenshot shows the 'Ventilation' section of the DEAP software interface. The 'Ventilation method' is set to 'Balanced whole-house mechanical ventilation with heat recover'. The 'Manufacturers declared (Appendix Q) values available' checkbox is checked. Under the 'Specific fan power for mechanical ventilation system' section, the 'Specific fan power [W/[l/s]]' is entered as '.99' and the 'Heat exchanger efficiency [%]' is entered as '89'. The 'Manufacturer and model name' is 'Model X' with a note 'from SAP Appendix Q'.

**Distribution system losses and gains tab:** Responsiveness category set to '1' and warm air heating system not specified:

Control and responsiveness					
Temperature adjustment [°C]	<input type="text" value="0"/>				
Heating system control category	<input type="text" value="3"/>				
Heating system responsiveness category	<input type="text" value="1"/>				
Mean internal temperature during heating hours [°C]	<input type="text" value="19.08"/>				
Mean internal temperature [°C]	<input type="text" value="17.11"/>				
Additional heat emission due to non-ideal control and responsiveness [kWh/y]	<input type="text" value="0"/>				
Gross heat emission to heated space [kWh/y]	<input type="text" value="15703"/>				
Pumps and fans					
	Number present	Boiler controlled by room thermostat	Inside dwelling	Electricity consumption [kWh/y]	Heat gain [W]
Central heating pump	<input type="text" value="1"/>	<input type="text" value="Yes"/>		<input type="text" value="130"/>	<input type="text" value="10"/>
Oil boiler pump	<input type="text" value="1"/>	<input type="text" value="Yes"/>	<input type="text" value="No"/>	<input type="text" value="100"/>	<input type="text" value="0"/>
Gas boiler flue fan	<input type="text" value="0"/>			<input type="text" value="0"/>	
Warm air heating system present?	<input type="text" value="No"/>			<input type="text" value="0"/>	<input type="text" value="0"/>