The Besblock thermal modelling system, CSH 3 and L1A 2010 & SAP 2009

New Approved Document L1A 2010 comes into force in October 2010 with aims to reduce CO_2 by 25% over L1A 2006. This is a 40% improvement over a dwelling built to the 2002 regulations. If you have Building Regulations approval to L1A 2006 on or before the 30/9/10 you must commence build by 30/9/11 otherwise L1A 2010 will apply to your development.

The Besblock Thermal Modelling system with its associated lower y-values enables this 25% improvement to be achieved often without renewable energy sources.

The Besblock thermal modelling exercise was undertaken in conjunction with its Star Performer block to minimise the effect of Thermal Bridges (heat loss) that occur at junctions between building elements. The resultant psi-values (ψ) have been calculated in accordance with BRE I/P 106 and BR 497 as required by SAP 2009.

- Often, assessors will increase fabric insulation in an attempt to attain the 25% carbon emission reduction.
- With U-values often as low as 0.14, 0.18 and 0.27 for the various elements of the fabric, by the law of diminishing returns this is usually *not* the most cost-effective option.
- A more effective method is to first examine and minimise the heat loss at thermal bridges, openings and junctions by adopting junction design details with low ψ values
- The Besblock Thermal Modelling system does exactly this, delivering ψ values typically 50% better than the standard accredited values.

What is a y-value?

- For a visual illustration of this click here
- The y-value in the SAP is a factor to estimate the heat loss at junctions in new dwellings. Besblock y-values are always derived from the total thermal bridge losses calculated using the ψ multiplied by the total length of each junction in the house type. The lower the y-value, the less heat is lost.
  Currently under SAP 2005
- Default value is y = 0.15.
  For Accredited Construction detail, y = 0.08.
  With the Besblock thermal modelling system, y- values of 0.035 and below are often achieved.
- In SAP 2009 where details of the thermal bridges are unknown a default y-values 0.15 should be used.
- All other thermal bridge losses should be calculated using ψ values. Where junctions conform to accredited construction details assessors should use the ψ values shown in table K1 of SAP 2009.

- Alternatively ψ calculated in accordance with BRE IP 1/06 and BR 497 may also be used. This is the Besblock TM system and these ψ are typically 50% better than those in table K1 of SAP 2009
- It must be stressed that our junction details *must* be used on site if the Besblock TM ψ values are used in the SAP calculation.
- Junction details and ψ values based on our Accredited Details can be downloaded at our website www.besblock.co.uk

What does this mean?

- The SAP calculates the total area of all exposed elements of the building fabric and multiplies each element by its U-value to give the heat loss for that element. The sum total of the elements gives the total heat loss for the fabric.
- Whichever y-value is adopted, the total fabric area will be multiplied by that figure and the result is added into the total heat loss calculation.

Examining the example below:

- Default: y = 0.15: Fabric is multiplied by 0.15. The resultant figure is added into the heat loss which becomes 182.13 W/K
- Y = 0.08 (accredited construction detail) Fabric is multiplied by 0.08. The resultant figure is added into the heat loss which becomes 157.13 W/K

- Besblock TM system y = 0.035: Fabric area is multiplied by 0.035. The resultant figure is added into the heat loss which becomes 141.06 W/K

Example:

A detached house has a total exposed element area of 357.20m^2, made up as follows:

Element	Area m^2	U-value	Total heat loss W / K
Doors	1.95	2.45	4.78
Windows	29.04	1.68	48.76
Ground floor	71.09	0.21	14.93
Walls	184.04	0.28	51.53
Roof	71.08	0.12	8.53
Total exposed Elements:	357.20	Total fabric Heat loss, (no correction)	128.55

Estimated heat loss at junctions for this dwelling:

	y-value	Estimated heat loss At junctions (W/K)	Revised heat loss for dwelling (W/K)
SAP default	0.15	53.6	182.13
Accredited Construction Detail	0.08	28.6	157.13
Besblock TM system	0.035	12.5	141.06

More information on SAP 2009

Cavity party walls

A key feature of SAP 2009 is that party walls with unfilled and unsealed cavities are assumed to have a U value of 0.5 W/m2K. The notional dwelling used in calculating the TER assumes a U value for cavity party walls of 0.0 W/m2K. This compares to 0.4 W/m2K in last year's Part L1A 2010 consultation.

The new default U-values are for cavity party walls:

Cavity unfilled with unsealed edges 0.50 W/m2K
Cavity unfilled with sealed edges   0.20 W/m2K
Cavity filled with sealed edges   0.00 W/m2K

Thermal Bridges – 0.08 for ACDs no longer an option

In Part L1A 2006, it is acceptable to assume a y value of 0.08 W/m2K if Accredited Construction Details have been used. This will not be possible with Part L1A 2010. Instead, the length of each junction will need to be measured, multiplied by the appropriate psi values and added up to produce an 'effective' y value.

The psi values can be either;
- The values already supplied in the SAP 2009 document (table K1),
- Supplied by the relevant approved government ACD scheme.
- Calculated for specific junctions. The psi values calculated for specific junctions must be done in accordance with BRE IP 1/06 and BR497. This is the Besblock TM system.

A confidence factor will be applied to any psi value calculation for an individual junction if no on site checks can be demonstrated to have been made. The confidence factor applied to the psi value calculation is 25% or 0.02 (added to the psi value), whichever is the larger. With these confidence factors applied, the Besblock psi values used in the TM system are significantly better than the government accredited details and will not require on site checks.

Air Permeability – more pressure testing and a confidence factor for untested dwellings

The volume of pressure testing required will roughly double. A pressure test should be carried out on three units of each dwelling type or 50% of the instances of the dwelling type, whichever is the smaller.

In addition, a confidence factor will apply to dwellings not pressure tested. Where a dwelling has been pressure tested, the measured value is used in the calculation of the DER. Where the dwelling has not been pressure tested, the value used in the DER calculation is the average of the measured values for dwellings of the same type but with the addition of a confidence factor of 2.0 m3/(h.m2) at 50 pa. This means in effect that the design air permeability must be at most 8.0 in order to meet the maximum allowable value of 10.0 at completion of the dwelling. A value of 15.0 can still be used.

New Limiting U values – including for party walls

Element	2006	2010
Roof	0.25	0.20
External Wall	0.35	0.30
Party Wall	N/A	0.20
Floor	0.25	0.25
Windows	2.20	2.00
Air Permeability	10	10

For further advice contact Technical Services Dept on 01952 685000
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