Changes to Part L – Approved Document L 2013

The new Approved Document comes into effect on 6th April 2014 and applies to works from this date, unless work has already started on site, or a formal application was submitted prior to this date (with the requirement that works start on site before April 2015). The new Approved Document L 2013 highlights the next step towards the challenge of zero carbon homes and low carbon non-domestic buildings.

- For **new homes** the amendment equates to an approximate 6% improvement to CO_2 targets on Part L 2010, with a focus on fabric performance.
- For ***non-domestic buildings*** there is an approximate 9% improvement with elemental backstops. This should be achievable through cost effective fabric and services in most building types, consistent with fabric focused approach for homes.
- There is to be no uplift in fabric energy efficiency standards for work on ***existing*** homes or non-domestic buildings.

To allow for flexibility in the design, there has been no change in limiting fabric U values. In the case of walls, the maximum U-value would remain as 0.30W/m^2K, although in practice, U-values less than this will be required. The maximum air permeability is also retained as 10m^3/h/m^2 at 50 Pa. In addition, there are no changes to the air permeability testing rates.

Domestic Buildings

The main change introduces an additional target, called the fabric energy efficiency (FEE) rate, for the dwelling in addition to setting a new CO_2 target. The purpose of this additional requirement is to ensure that a design has good levels of fabric insulation that is a long lasting and permanent solution rather than one which relies on renewable energy sources as the main route to compliance with relatively poorly insulated elements.

There are two basic criteria that must now be met:

- The calculated rate of CO_2 emissions from the dwelling (the Dwelling Emission Rate, DER) must not be greater than the Target Emission Rate (TER) - which is the case for Part L 2010.
- The calculated Dwelling Fabric Energy Efficiency (DFEE) rate must not be greater than the Target Fabric Energy Efficiency (TFEE) rate.

The TER is expressed in terms of the mass of CO_2 emitted, in units of kg per m^2 of floor area per year.
The TFEE rate is expressed in terms of the amount of energy consumed in units of kWh per m^2 of floor area per year.
Both the TFEE rate and TER for individual dwellings must be calculated using the new SAP2012. It is unlikely that commercial SAP2012 software will be available until early 2014 which is why BRE are temporarily making available a beta version of their software to allow house types and proposed designs to be checked against the new requirements.

Target Emission Rate (TER)
The TER is calculated from the CO_2 emissions of a notional dwelling of the same size and shape as the actual dwelling with specific performance criteria set to the reference values (as summarised in Table 1 below). This is similar to the 2010 approach except that the notional dwelling is now based on reference values which have been set at a level which will provide the targeted 6% reduction in CO_2 (when adopted in their entirety) rather than on the historic 2002 notional building with improvement factors applied.
As such, one means of achieving the TER would be to adopt the parameters in the notional dwelling for the actual dwelling. However, the guidance is not prescriptive and the actual dwelling emission rate can be based on any other solution as long as the TER is not exceeded and the guidance from the other parts of the Approved Document are followed.

Target Fabric Energy Efficiency (TFEE) rate
The TFEE is calculated by determining the fabric energy efficiency of the same notional dwelling as detailed above and relaxing the figure by 15% to give the TFEE rate. This represents a mandatory minimum performance of the building fabric and is derived only from the reference values for the

external fabric, windows and doors, air tightness and linear thermal transmittance. The TFEE is not influenced by the heating fuel, lighting or ventilation strategy.

Table 1: Summary of reference values for notional dwelling

Element or System	Values
Opening areas (windows and doors)	Same as actual dwelling, up to a maximum of 25% of total floor area
External Walls	0.18 W/m²K
Party Walls	0.00 W/m²K
Floor	0.13 W/m²K
Roof	0.13 W/m²K
Windows, roof windows, rooflights and glazed doors	1.40 W/m²K g-value = 0.63
Opaque doors	1.0 W/m²K
Semi glazed doors	1.2 W/m²K
Air tightness	5.0 m³/hr/m²
Linear thermal transmittance	"y" determined from lengths of junctions in the actual dwelling and standardised psi values given in SAP2012, Appendix R. Alternatively, y taken as 0.05 where default y = 0.15 has been assumed in the actual dwelling

The full set of reference values also give requirements for ventilation, space and water heating systems and low energy lighting.

Multiple occupancy buildings
Where a building contains more than one dwelling (such as in a terrace of houses or in a block of flats), compliance can be achieved if either

a) every individual dwelling has a DFEE and DER rate that is no greater than its corresponding TFEE and TER rate
or
b) the average DFEE and DER is no greater than the average TFEE and TER. The average values are the floor-area-weighted averages of all the individual dwelling values. When adopting the average approach, it will still be necessary to provide information for each individual dwelling.

Thermal Bridges

The energy lost through thermal bridges can be very significant. The building fabric has to be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements, at the joints between elements, and at the edges of elements such as those around window and door openings.

The Approved Document recognises that reasonable provision would be to:

a) Adopt approved design details such as the DCLG Accredited Construction Details, in which case the calculated linear thermal transmittance values can be used directly in the DER calculation, or
b) Calculate the linear thermal transmittances and temperature factors following the guidance set out in BR 497. The linear thermal transmittance values can be used directly in the DER calculation. Reasonable provision for the temperature factors is that they should achieve a performance no worse than that set out in BRE IP 1/06; or
c) Use a conservative default y-value of 0.15 in the DER calculation.

The use of H+H aircrete would be covered by the Constructive Details Handbooks for aircrete, so helping to avoid the need to adopt onerous Default values. Where the approved design details are not available for all

junctions, the corresponding values in the 'Default' column of Table K1 in SAP2012 can be used for those junctions for which a linear thermal transmittance is not available. Alternatively, the linear thermal transmittance of these junctions can be calculated as in (b) above.

When adopting the approaches in (a) and (b), the builder would be required to demonstrate that their construction procedures achieve the required standard of consistency by an appropriate system of site inspection. One way of achieving this would be to produce a report demonstrating that the relevant checklists outlined in the Constructive Details Handbooks have been completed and show satisfactory results.

Non Domestic Buildings

The main changes to Approved Document L2A are:

- The notional building reference values have been updated to give an overall 9% reduction in CO_2 emissions across the new-build mix for the non-dwellings sector
- Separate notional buildings defined for top-lit, side-lit (heated only) and side-lit (heated and cooled) buildings
- Notional building air permeability sub divided by size
- Target based on fabric and services only consistent with new homes

As for 2010, it is required that the Building Emission Rate (BER) is no worse than the Target Emission Rate (TER). The TER is based on a building of the same size and shape as the actual building, constructed to a concurrent specification (see Table 4 below) and no improvement factor to be applied. Consequently, if the actual building is constructed entirely to this concurrent specification it will meet the TER and therefore pass Criterion 1. However, as with Part L1A, the guidance is not prescriptive and the BER can be based on any other solution as long as the TER is not exceeded and the guidance from the other parts of the Approved Document are followed.

Table 2: Reference values for non-domestic buildings

Element or System		Side lit or unlit (heating only)	Side lit or unlit (includes cooling)	Top lit
External Walls		0.26 W/m²K	0.26 W/m²K	0.26 W/m²K
Floor		0.22 W/m²K	0.22 W/m²K	0.22 W/m²K
Roof		0.18 W/m²K	0.18 W/m²K	0.18 W/m²K
Windows		1.60 W/m²K g-value = 0.40 light transmittance = 71%	1.60 W/m²K g-value = 0.40 light transmittance = 71%	N/A
Rooflights		N/A	N/A	1.80 W/m²K g-value = 0.55 light transmittance = 60%
Air tightness	Floor area ≤ 250m² 250 - 3500m² 3500 - 10000m² 10000m² ≤ floor area	5.0 m³/hr/m² 3.0 m³/hr/m² 3.0 m³/hr/m² 3.0 m³/hr/m²	5.0 m³/hr/m² 3.0 m³/hr/m² 3.0 m³/hr/m² 3.0 m³/hr/m²	7.0 m³/hr/m² 7.0 m³/hr/m² 5.0 m³/hr/m² 3.0 m³/hr/m²

Solutions

There will be a range of U-values that can be used to achieve compliance with Part L, examples of typical wall constructions giving U-values ranging from 0.28 to 0.18W/m²K are given in Table 3 below. Please contact our Technical Services Department where other specific U-values are required or where construction is not shown.

Table 3: Typical wall U-values

0.28 W/m²K	0.25 W/m²K	0.22 W/m²K	0.20 W/m²K	0.18 W/m²K
Brick outer leaf, partially filled cavity				
Brick outer leaf Clear cavity 45mm PIR insulation 100mm Celcon Standard Any finish	Brick outer leaf Clear cavity 50mm PIR insulation 100mm Celcon Standard Plasterboard on dabs	Brick outer leaf Clear cavity 65mm PIR insulation 100mm Celcon Standard Any finish	Brick outer leaf Clear cavity 75mm PIR insulation 100mm Celcon Standard Plasterboard on dabs	Brick outer leaf Clear cavity 95mm PIR insulation 100mm Celcon Standard Any finish
Brick outer leaf, fully filled cavity				
Brick outer leaf 100mm Full fill 37 100mm Celcon Standard Any finish	Brick outer leaf 100mm Full fill 32 100mm Celcon Standard Plasterboard on dabs	Brick outer leaf 125mm Full fill 32 100mm Celcon Standard Any finish	Brick outer leaf 150mm Full fill 32 100mm Celcon Standard Any finish	Brick outer leaf 150mm Full fill 32 100mm Celcon Standard Plasterboard on dabs
Solid wall, internally insulated				
Render 215mm Celcon Solar 50mm Thermaline Super thermal laminate board	Render 215mm Celcon Standard 60mm Thermaline Super thermal laminate board	Render 215mm Celcon Standard 70mm Thermaline Super thermal laminate board	Render 215mm Celcon Solar 70mm Thermaline Super thermal laminate board	Render 215mm Celcon Standard 80mm Thermaline Super thermal laminate board
Solid wall, externally insulated				
Render 40mm PIR insulation 215mm Celcon Solar Any finish	Render 50mm PIR insulation 215mm Celcon Solar Any finish	Render 65mm PIR insulation 215mm Celcon Solar Any finish	Render 75mm PIR insulation 215mm Celcon Solar Any finish	Render 90mm PIR insulation 215mm Celcon Solar Any finish

Notes
Ancon Staifix RT2 cavity wall ties assumed
Celcon Standard Grade blocks assumed as being laid in 10mm traditional mortar joints. Thin jointed blockwork will be at least as good
Any finish based on dense plaster. Lightweight or plasterboard may also be used
PIR insulation = PIR/PUR with thermal conductivity of 0.022W/mK (foil faced for partial fill use)
Full fill 37 / 32 = full fill insulation with a thermal conductivity of 0.037 / 0.032W/mK respectively

Optimum solutions can be achieved by balancing various elements of the structure and trading one off for another. One of the simplest ways of achieving this is by using the enhanced thermal linear bridging that can be obtained when using H+H aircrete in foundations, floors and separating walls. A complete set of details is available from the website www.constructivedetails.com which gives a range a psi-values for cavity (full and part fill) and externally insulated solid walls.

Use of H+H aircrete for both leaves of cavity separating walls can also make a significant difference to the energy loss, whether directly through the wall and via linear thermal bridging at the floor, roof and external wall junctions. Five of the six aircrete Robust Details can comply with the 'zero U-value' requirement provided that the cavities are adequately filled and sealed. The individual Robust Details give the appropriate type of cavity fill to use, for further details see www.robustdetails.com