DWELLINGS

Building Regulations for the Conservation of Fuel and Power

Kingspan® Insulation

Introduction

The latest amendments to Approved Documents L for the conservation of fuel and power (England) came into effect on 6 April 2014, and represent the penultimate in a series of stages leading to the ultimate target of net zero carbon for all new domestic buildings by 2016.

The journey began in 2002 with the introduction of more stringent requirements for the thermal performance of the individual elements of a building, i.e. roof, walls and floor, together with a new method for calculating compliance.

Subsequent changes in 2006 and 2010 steadily improved standards further, and changed the whole approach to constructing energy efficient buildings by looking at the carbon emissions of the building as a whole, rather than simply setting standards for the thermal elements. This brought in factors such as lighting systems, air tightness, thermal bridging, occupancy and use, and solar gain.

Interestingly, the latest changes revert to an emphasis on the contribution that is made by the building envelope itself, with new minimum standards of performance, and with a capacity to achieve compliance through a fabric first approach, without the need to rely on renewable technologies.

Although the gap between the current standards and the 2016 net zero carbon targets is still significant, having this fresh focus on the building envelope will provide a solid platform from which to make this final leap.

This E-brochure takes a look at the requirements of Approved Documents L1A and L1B 2013 for dwellings, and provides examples of some different routes to achieving compliance.

2002

- Simple but prescriptive methods of compliance using either elemental or target thermal performance values (U-values) or carbon index.
- New Combined Method of calculating compliance using SAP 2002.

2006

- Introduction of a whole building carbon emissions approach, with minimum Target CO_2 Emissions Rate (TER) showing a 20% improvement in energy performance against a 2002 notional building of the same type.
- All dwellings must be designed and built such that their Dwelling CO_2 Emissions Rate (DER) is no worse than the TER. Compliance claculated using updated SAP 2005.
- Approved Documents split into new build (ADL1A) and refurbishment (ADL1B)

2010

- 25% carbon reduction from 2006 standards for new build.
- SAP 2009 updated to include party walls; new focus on heating, lighting, air leakage and solar gain.
- The emission rate calculation has to be completed at design stage and submitted to Building Control with the planning application.

2014

- 6% aggregate improvement over 2010 standards. SAP 2012
- Introduction of minimum Fabric Energy Efficiency Standards (FEES).
- New Notional Dwelling Specification can be used as a route to compliance.
- Design stage submissions are needed 1 day before work starts and evidence of as built compliance is needed within 5 days of the work ending.

2016

- All new dwellings to achieve net zero carbon emission target.

Approved Document L1A (ADL1A): New Dwellings

Fabric First

The latest changes still leave a significant performance gap before net zero carbon can be achieved, but the introduction of the new Fabric Energy Efficiency Standards (FEES) provides a solid platform from which to meet that target, and holds real promise for the industry moving forwards.

Under the new ADL1A, a Target Fabric Energy Efficiency (TFEE), which the Dwelling Fabric Energy Efficiency (DFEE) must not exceed, now sits alongside the existing Dwelling Emission Rate (DER) and Target Emission Rate (TER), assuring good levels of minimum building fabric performance.

The other big change is that this time round there is a new 2013 Notional Dwelling Specification. This specification defines the TFEE and the TER directly, rather than in the 2010 ADL1A where the notional dwelling defined a target that was then reduced by a further factor to show progression over the previous ADL.

Routes to Compliance

The huge potential benefit of the 2013 Notional Dwelling Specification is that adopting it to the letter would theoretically result in a design that complies with the new standards; a simple route to compliance for smaller developers. However, the Notional Dwelling Specification includes an air-tightness level of $5m^3/hr/m^2$ @ 50Pa, which, in practice, could be extremely arduous to achieve for a conventional masonry construction.

In developments where not every individual house is going to be tested, those that are must achieve $3m^3/hr/m^2$ @ 50Pa before $5m^3/hr/m^2$ @ 50Pa can be used for the remainder of the development. This also has the knock on effect of dropping the designed air-tightness down below the level at which the introduction of mechanical ventilation to the tested houses becomes necessary.

The next major issue lies with the fact that there is not as yet a book of accredited details to provide the psi-values that are written into the 2013 Notional Dwelling Specification. Therefore every detail will need to have a bespoke calculated psi value. Alternatively, 2010 Accredited Construction Details could be used, but these will not yield the psi-values assumed in the 2013 Notional Dwelling Specification.

Simple Solutions 1: Masonry Construction

One straightforward way to beat the TFEE and TER for a conventional masonry construction, and meet the requirements of ADL1A, will be to design to an air-permeability of $7m^3/hr/m^2$ @ 50 Pa, and to continue to use 2010 ACDs, whilst specifying opaque fabric U-values that are about 0.02 better than in the 2013 Notional Dwelling Specification, though the exact reduction will vary depending on the nature of the dwelling.

	Notional Dwelling Specification	Recommended Starting Specification for Masonry Construction
Floor U-Value (W/m².K)	0.13	0.11
Wall U-Value (W/m².K)	0.18	0.16
Roof U-Value (W/m².K)	0.13	0.11
Thermal bridging	Tougher psi-values than 2010 Accredited Construction Details	2010 Accredited Construction Details
Airtightness	5.0 m^3/m^2/hr@50Pa.	7.0 m^3/m^2/hr@50Pa.

Table 1

Using a premium performance insulation material will allow these U-values to be achieved without impacting unduly on the overall construction in terms of size and weight.

Simple Solutions 2: Structural Insulated Panels (SIPs)

Whereas high levels of airtightness can be a challenge to achieve with a standard masonry construction, the opposite is true of buildings constructed using Structural Insulated Panels (SIPs), which also have the advantage of greatly reduced thermal bridging, together with low thermal mass. SIPs are now so widely used that they can be considered as the third method of construction, and they bring a number of benefits to the table.

An example of a typical SIP construction would be two 15mm OSB/3 (Oriented Strand Board) facings with a 112mm rigid urethane insulation core, providing a thermally efficient, structurally strong, rigid panel.

The panels are factory cut to the design of the building, ready to slot together using special jointing systems that provide very high levels of airtightness. Finished constructions can produce air-leakage rates as low as $1m^3/hour/m^2$ at 50 Pa. SIPs can help to avoid problems which may be associated with other common construction techniques, such as air-leakage through poorly sealed sockets or switches, at floor zones through masonry cavity walls, under skirting boards and through poorly sealed loft hatches and top storey ceiling light fittings.

As well as providing an effective air seal, the jointing arrangements in SIPs mean that the insulation layer is typically interrupted by less repeating studwork than in a timber frame, greatly reducing repeating thermal bridging.

For example, in a property constructed with traditional timber frame, the repeating thermal bridges caused by timber studs in the walls and rafters in the roof, means that it is normally assumed that 15% of the walls and 6% of the roof are uninsulated. In reality, the %s are normally much higher than this. By comparison, in a property constructed with SIPs, as little as 4% of the walls and 1% of the roof may be uninsulated.

Under ADL1A the specification of SIPs could allow for more relaxed U-values, for example $0.20W/m^2.K$ for roof and walls, which together with manufacturer's accredited psi values, an airtightness of $1.0m^3/m^2$/hr @ 50Pa and MVHR would achieve compliance.

Where low U-values are also desired, an elemental thermal performance of $0.10W/m^2.K$ or better can easily be achieved with the addition of an insulated lining, readily opening the way to meeting the 2016 net zero carbon targets.

Case Study
Hanham Hall

The Kingspan TEK® Building System has been installed as part of the walls and roofs of 185 new properties in South Gloucestershire, helping to form one of the UK's largest Zero-Carbon developments

Hanham Hall features a range of one to five bed-roomed properties centred around the refurbished, grade II listed Hall. Kingspan TEK® was involved from the initial design phase of the project and worked alongside HTA Design LLP, Barratt Homes and Sovereign Housing Association right through to the final detailing. The Kingspan TEK® Building System panels comprise a high performance insulated core sandwiched between two layers of Oriented Strand Board type 3 (OSB/3) and were designed and factory pre-cut to the project's requirements by Kingspan TEK® Delivery Partners, Kingspan Timber Solutions.

Rory Bergin from HTA Design LLP commented "The key challenge at Hanham Hall was finding ways to ensure that the demanding requirements of the Carbon challenge and the new Zero-Carbon 2016 targets could be met consistently across the site. As such, we tailored the building designs to ensure complex details were designed out at an early stage. Specification also formed a crucial part of this process and we chose the Kingspan TEK® Building System both because of its high performance characteristics and its established track record in assisting projects reach the top standards in building performance."

In a typical external wall construction, a vapour barrier was stapled to the external face of the Kingspan TEK® Building System followed by timber cladding fixed on battens. 30mm thick Kingspan Insulation Thermawall TW55 was installed internally, helping to further reduce both heat loss and thermal bridging, followed with a service cavity and a layer of plasterboard. Additional Thermawall TW55 was also used for the roofs, with standing seam metal roof cladding installed above a vapour barrier externally. Both constructions were awarded an A+ BRE Green Guide Summary Rating.

The constructions achieved outstanding thermal performance, with a typical roof of $0.11 W m^2/K$ and wall U-value of $0.15 W m^2/K$, whilst the Kingspan TEK® Building System's unique jointing system helped maintain air leakage rates below the target maximum of $1.5 m^3/hr/m^2$ @50 Pa.

Hanham Hall was created under the Carbon Challenge initiative promoted by the Homes and Communities Agency.

Seeing the evidence

Another important change to be aware of is the fact that evidence must now be provided to show that the building design meets the targets, and that the building itself meets or exceeds the designed performance. An EPC by itself does not demonstrate compliance and must be accompanied by documentation to show that the dwelling meets the required targets, along with information about how this was achieved. Design stage submissions are needed 1 day before work starts and evidence of as built compliance is needed within 5 days of the work ending.

Approved Document L1B (ADL1B): Existing Dwellings

The requirements for refurbishment under ADL1B remain largely unchanged, yet even as they stand they represent both an opportunity and a challenge, as large numbers of existing dwellings that will be with us for decades to come currently have little or no insulation.

New & Replacement Thermal Elements

Any new or replacement roofs, walls and floors should have U-values no worse than the following:

- Pitched roof (insulation at ceiling level) – 0.16W/m^2.K
- Pitched roof (insulation at rafter level) – 0.18W/m^2.K
- Flat roof or roof with integral insulation – 0.18W/m^2.K
- Wall – 0.28W/m^2.K
- Floor – 0.22W/m^2.K

However, lesser provisions are allowed where meeting these standards would result in a significant impact on the existing structure e.g. a reduction of more than 5% in the internal floor area of the room bounded by the wall, or problems in relation to adjoining floor levels.

The new or replacement building fabric should 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 e.g. wall and floor junctions, and at the edges of elements such as those around window and door openings. Reasonable provision should also be made to reduce unwanted air leakage through the newly constructed thermal elements. A suitable approach to showing the requirement has been achieved would be to adopt Accredited Construction Details.

Renovation of Thermal Elements

Renovation of a thermal element i.e. floor, wall or roof, could include the provision of a new layer, such as cladding or rendering an external wall surface or dry-lining the internal surface. It could also involve the replacement of an existing layer, such as replacing the water proof membrane on a flat roof.

Where 50% or more of the surface of a thermal element, or 25% of the total building envelope is renovated, the performance of the whole element should be improved to achieve or better the following target U-values:

Element	Threshold U-value (W/m^2.K)	Target U-value (W/m^2.K)
Pitched roof – insulation at ceiling level	0.35	0.16
Pitched roof – insulation at rafter level	0.35	0.18
Flat roof or roof with integral insulation	0.35	0.18
Wall – cavity insulation	0.70	0.55
Wall – external or internal insulation	0.70	0.30
Floor	0.70	0.25

Table 2

If achievement of the target U-value is not technically or functionally feasible or would not achieve a simple payback of 15 years or less, the element should be upgraded to the best standard that falls within those criteria.

Retained Thermal Elements

Where an existing thermal element is part of a building subject to a material change of use, or where an existing element is to become part of the thermal envelope where previously it was not, e.g. as part of a loft or garage conversion where the space is now to be heated, those thermal elements should be upgraded to achieve the target U-values in Table 2, provided this is technically, functionally and economically feasible. A reasonable test of economic feasibility is to achieve a simple payback of 15 years or less.

Where the target U-value in Table 2 is not technically, functionally or economically feasible, then the thermal element should be upgraded to the best standard that is possible with a simple payback period of 15 years or less. Examples of where lesser provision than the target U-value might apply are where the thickness of the additional insulation might reduce usable floor area of any room by more than 5%, or where the weight of the additional insulation might not be supported by the existing structural frame.

Beware the cheap option

It's not difficult to see that with both internal and external insulation, there are potential space constraints: floor area reduction for internal and limits created by eaves overhangs for external. There is also an inevitable temptation on cost grounds to use as cheap an insulation material as possible. However, cheap insulation materials also tend to be at the low end of the performance spectrum and, therefore, the thickness needed to achieve the required U-value of 0.30W/m^2.K is more likely to transgress the 5% floor area reduction limit or to be too thick to fit under an existing eaves overhang.

The temptation would be to argue to building control that the thickness should be reduced to fit the space available. However, LABC has produced a guidance document on the renovation of thermal elements, which sets out the circumstances under which this might be acceptable. The guidance makes it absolutely clear that the U-value cannot be debased, without first considering whether a higher performing insulation material can deliver the required U-value within the space constraints of the building and the 15 year simple payback period.

Specification Matters

Working within the constraints of an existing structure is bound to have its challenges, but this guidance from the LABC makes it clear that the target U-values set out in ADL1B should not be derogated if it is technically and economically feasible to achieve them. Using high and premium performance products such as rigid thermoset insulation make this possible by providing thin, lightweight solutions that offer a payback within 15 years.

Material Change of Use and Change of Energy Status

Where a building is subject to a change of use, e.g. from commercial to domestic use, or a change to its energy status, e.g. any change which results in a building becoming subject to the energy efficiency requirements of the Building Regulations, where previously it was not, then ADL1B requires that the thermal performance of the walls, floors and roofs achieve a minimum standard of performance, which varies depending on the nature of the works taking place.

Case Study

This case study focuses on the results from two properties in Lancashire, one in the seaside town of Morecambe and one in the market town of Burnley, which were upgraded using premium performance rigid modified resin internal wall insulation (IWI). In both cases the IWI was installed with due care and attention to detailing around joints, openings and junctions by experienced dry-lining operatives, employed by Mansell Projects Ltd, a reputable contractor with a long history in professional dry-lining.

The property in Morecambe was a pre-1900, 2 storey end-terrace dwelling with 500mm thick stone walls. The owners preferred IWI over EWI since they did not want the rustic stone façade to be concealed. Furthermore, the dwelling was situated in a conservation zone, which may have made the granting of planning permission for works to the exterior of the property more difficult. The retrofit was completed without the owners having to leave their home, allowing them to be involved in decisions about both the finish and aesthetics of the work.

The selected system was the Kingspan Kooltherm K18 Insulated Dry-Lining System: comprising 92.5mm thick Kingspan Kooltherm K18 Insulated Plasterboard and a range of ancillary fixing components that satisfy stringent performance specification requirements.

Wall U-value measurements showed an excellent 83% improvement in the thermal performance of the treated walls. The build-up enabled the achievement of a final U-value of 0.215W/m^2.K, which comfortably exceeds the target performance outlined in Approved Document L1B.

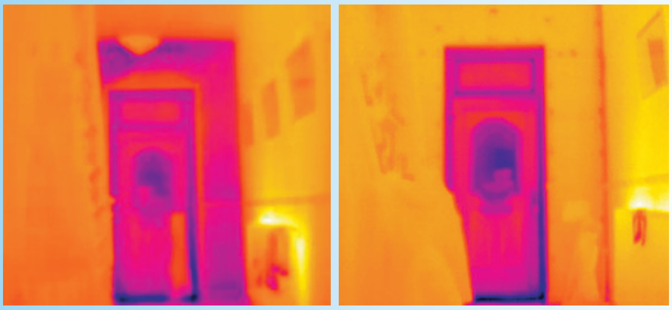
The results were monitored by the Energy Saving Trust (EST), and revealed a 20% saving in normalised annual gas consumption for primary space heating. Although auxiliary heating was provided by a dual fuel fire, which was later confirmed as being the main heat source for the ground floor living space, its contribution could not be measured, so the true savings are potentially even greater.

The gas usage in the pre-insulation period was constant throughout the day, whereas morning and afternoon heating in the post-insulation period was almost entirely absent. This indicates that the alleviation of heat loss resulting from the improved thermal performance of the walls had enabled the owners to maintain comfortable daytime temperatures without additional heating.

The property in Burnley was a pre-1900, 3-storey mid-terrace also with 500mm thick stone walls. The area surrounding the property was part of an ongoing renewal project (a property "face-lifting" scheme in Burnley) and so external works were restricted. IWI was therefore the preferred option.

The same dry-lining system was installed by Mansell Projects, incorporating 92.5mm thick Kingspan Kooltherm K18 Insulated Plasterboard mechanically fixed to 25 x 50mm pre-treated timber battens, lined with 100mm wide DPC strips. This provided a U-value of 0.18W/m^2·K – an outstanding result for an insulated solid wall, demonstrating a significant improvement of 89% over the original performance, the level of airtightness was also improved by a considerable 57%.

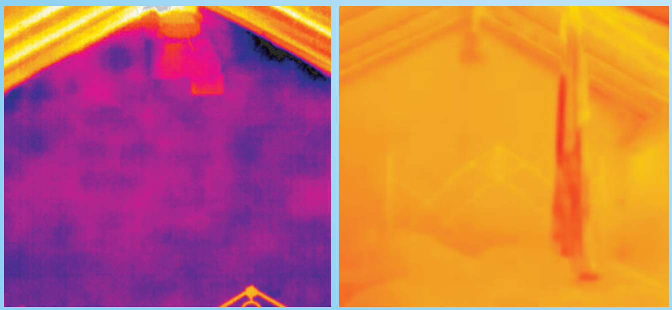
Burnley front door:



Before After

The effectiveness of the System is highlighted in the thermal images taken after the installation, and is particularly evident at junction locations where the cold regions appear to have been minimised. This, combined with the reduced air-leakage, emphasises the positive impact of proper installation practice and good detailing.

Burnley attic room:



Before After

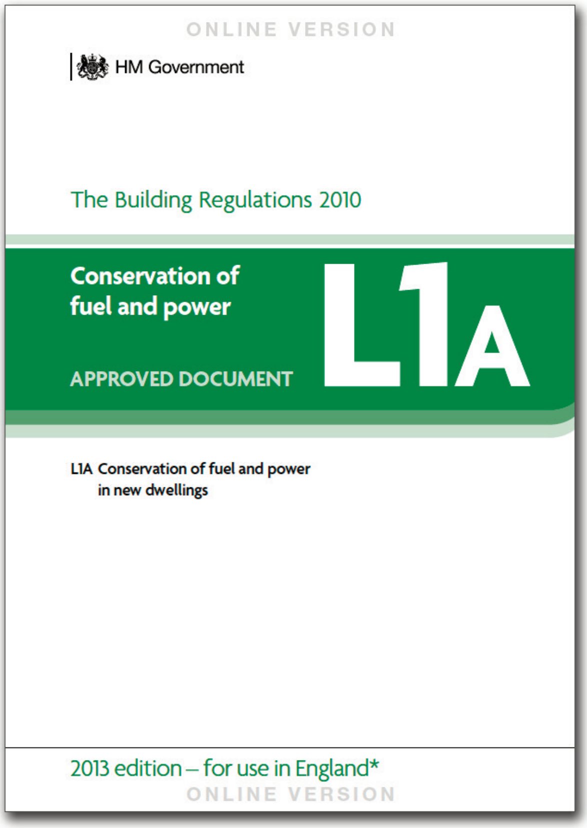
A study of the heating behaviour patterns at the property indicated that the increased thermal efficiency of the building envelope has enhanced its ability to retain heat and enabled a reduction in both the intensity and duration of heating events to achieve the desired temperature.

Following the installation the results at the Burnley property have shown an impressive 45% decrease in normalised annual gas consumption for primary space heating, with a corresponding reduction in both CO_2 emissions and heating bills for the owners, whilst allowing them to enjoy an increase in average indoor temperature.

Although the results at the property in Morecambe were less dramatic, this was a likely result of the unmonitored auxiliary heating system and the high level of uncontrolled air-leakage through the roof and floor which were not treated as part of the project; the savings were still sizable.

Whilst greater building insulation levels can lessen heat transfer via the building fabric, poor installation and detailing can result in little change in air-permeability and a concurrent increase in heat loss via junctions, which in turn presents a potentially increased risk of surface condensation. No issues with condensation were identified at either property following the installation.

The affordable installations, completed without the residents having to leave their homes, serve to emphasise the impact that properly fitted, premium SWI can have on both comfort and energy consumption within the UK's housing stock. In addition to the wider potential benefits resulting from reduced CO_2 emissions, these measures could also bring sustained relief to many struggling households across the country by cutting heating requirements, and consequently bills, down to size.



Future Planning

There is no question that the latest Approved Documents leave an enormous gulf to bridge if the net zero carbon targets are to be met in 2016. Placed in the context of this challenge, FEES will hopefully help to focus the industry on delivering maximum long-term energy savings through improved building fabric performance, before turning to more costly additional technologies.

To download the Kingspan Insulation guide to Approved Document L1A and L1B please visit: www.kingspaninsulation.co.uk/buildingregulations, or for further information contact:

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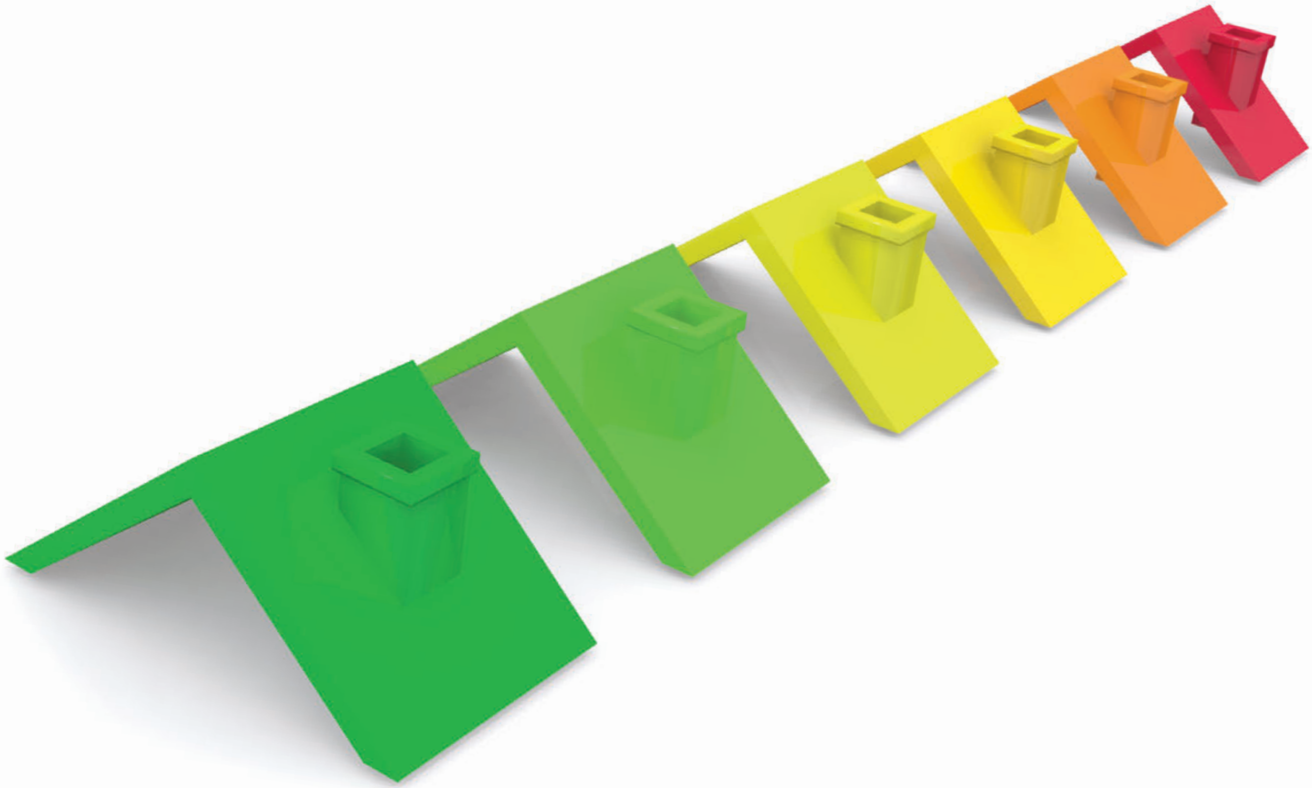

Part L for dwellings

Dr Paul Davidson, Director of Sustainable Energy at BRE highlights the main changes to Part L in terms of dwellings, and the implications for the construction industry...

On 6th April 2014, the new version of Part L of the Building Regulations came into force in England. The full documentation is available at www.planningportal.gov.uk , but this article describes the main elements of the changes for the new dwellings and the implications for the construction industry. In summary, the headline features are a further 6% tightening of the carbon dioxide emission target for new dwellings, supplemented by a new mandatory target for the energy efficiency of the building fabric alone. For non-domestic buildings, the CO2 target is reduced by 9% on aggregate. Requirements for existing buildings undergoing refurbishment remain largely unchanged from 2010.

The policy context

The new Part L changes take place in the context of a number of national and European policies – some of which are potentially at odds with each other. The most fundamental is that government has confirmed – in its 2013 Budget statement and more recently – its continued commitment to the target of Zero Carbon new homes by 2016. In addition, the recast Energy Performance of Buildings Directive requires EU member states to work towards 'nearly zero energy buildings' by 2019 – an aspiration already endorsed in UK Building Regulations.

These considerations have led to the concept of the Zero-Carbon Triangle in which basic energy efficient design underpins low-and-zero-carbon service systems which together deliver a carbon compliance standard. If this falls short of the zero carbon target, then a number of alternative 'allowable solutions' are open to the designer. Department for Communities and Local Government (DCLG) has recently consulted on what these allowable solutions might comprise.

Operating in the other direction is the so-called 'Growth' commitment of 2010, which essentially aims to minimise the burden on industry of regulation of all sorts and particularly those impacting small businesses. The Red Tape Challenge also seeks to keep regulation to a minimum.

Part L 2013 is seen as an important and technically meaningful step forward which strikes a balance between the zero-carbon agenda and the growth commitment. As with other Part L steps, it aims to further reduce energy costs for consumers and businesses and makes an important contribution to delivering the carbon budgets set out in the Climate Change Act.

The consultation on Next Steps to Zero Carbon, along with a parallel 1 on the Housing Standards Review, looks forward to 2016 and the role of Building Regulations in delivering the zero-carbon objective.

New homes

There are 2 significant innovations in the requirements for new dwellings under Part L 2013, as set out in the new Approved Document L1A.

- The first is a new regulation (26A) that requires new dwellings to achieve, or better, a fabric energy efficiency target in addition to the carbon dioxide target.

- The second is the introduction of a 'concurrent' notional building specification, which sets the target for carbon dioxide emissions without the use of an improvement factor and is also used to set the target for the fabric energy efficiency.

The CO_2 target has been strengthened to deliver an aggregate 6% reduction in emissions, across the new-build housing mix, compared with Part L 2010.

Between them, these 2 requirements tackle the lower 2 segments of the Zero-Carbon Triangle, with further work needed to decide on the approach for 2016.

The notional dwelling used to determine the carbon dioxide and fabric energy efficiency targets is the same size and shape as the actual dwelling, but is defined to be constructed to a concurrent specification. A summary of this specification is published in Table 4 in the Approved Document with the full detail in SAP 2012 Appendix R (www.bre.co.uk/sap2012). For example, wall U-values are set at 0.18W/m^2degC and roofs at 0.13. If the actual dwelling is constructed precisely to the notional dwelling specifications, it will meet the carbon dioxide and fabric energy efficiency targets. However, this specification is not intended to be prescriptive and may very well not represent the most cost effective solution in any particular case. Developers are free to vary the specification, provided the same overall level of carbon emissions and fabric energy efficiency performance is achieved or improved. DCLG is encouraging the industry to compile a series of model designs to help in this process.

Fabric Energy Efficiency (FEE) is defined as the amount of energy needed for heating and cooling the dwelling during the year, expressed as kWh/m^2/yr. By setting a minimum performance standard for this parameter, Part L is ensuring that the fundamental structure of the dwelling meets basic energy efficiency requirements, and that a low-carbon energy source cannot be used to 'rescue' a poor fabric design. This recognises that the fabric of a building – the walls, floor, roof and glazing – is likely to remain in place untouched for long periods of its life and is often most costly to upgrade. By contrast, the HVAC plant has a finite life and will be replaced several times during the life of the building.

The Zero Carbon Hub has proposed standard target values for the FEE – known as FEES – for 2016. However, in the light of consultation responses, DCLG has decided not to set the bar this high for 2013 and the FEE value resulting from modelling the Notional dwelling is therefore relaxed (increased) by 15 to set the 2013 Target (TFEE).

Two other components of the calculation procedure are worthy of mention. Fuel factors were originally introduced as a way of relaxing the CO_2 target for dwellings without mains gas – either because they are built off the gas grid or to cover, for example, all-electric apartments. After consulting on the issue, DCLG has decided to retain the factors, amended for use from 2013. On a related issue, the CO_2 emission factors have been updated to reflect changes in the energy supply systems, most noticeably for electricity.

In addition to the 2 mandatory elements of the compliance test for new homes (which together comprise Criteria 1), there remain 4 other compliance tests (formally 'statutory guidance'). The first of these is the setting of elemental backstops (Criteria 2). The need for fabric backstops (maximum allowable U-values) has to some extent been overtaken by the FEE requirement – so these values remain unchanged from 2010. Standards for building services are once again contained in the Domestic Building Services Compliance Guide.

Criteria 3 has been changed slightly to limiting the effects of heat gains in summer, where the emphasis has widened from just considering the solar gains. This, for example, encourages the proper insulation of domestic hot water pipes.

Criteria 4 has also been revised from 2010, though still deals with the quality of construction and commissioning. It recognises the vital importance of doing everything possible to ensure the design intent is translated fully into practice and that the resulting performance in use is consistent with the calculated Building Emission Rate and Fabric Energy Efficiency rate. DCLG has commissioned the Zero Carbon Hub to investigate the gap between design and as-built performance; the results of that study are expected to inform future revisions to Part L.

One change from 2010 is the removal of the reference to separate quality assured accredited construction details for thermal bridging. Designers are encouraged to use DCLG Approved Construction Details for the junctions between fabric elements and at the edges of openings. The thermal effects of these details are best assessed in the SAP calculation using the actual dimensions of the junctions together with approved values for the linear thermal transmittance. Alternatively, designers can use a very conservative 'y' value for the overall transmittance, but will then need to improve the thermal performance elsewhere to meet the BER and FEE targets.

The provision of information to householders remains an important route to ensuring that dwellings perform to their design potential. The Approved Document provides additional guidance on how builders can best comply with this Criteria 5.

Compliance tools

Compliance with the 2013 Part L requirements for dwellings will be demonstrated using new commercial software tools based on the 2012 version of SAP – the Standard Assessment Procedure (available at www.bre.co.uk/sap2012). Pending the production of these tools, Department for Energy and Climate Change (DECC) has asked BRE to produce a temporary, updated version of cSAP (used alongside the Part L consultation) to allow industry to experiment with house designs and building products.

The official release of the 2013 version of SBEM – v5.2.b – was made available at www.ncm.bre.co.uk from 3 April 2014.

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Progress on the gap?

Ian Orme, Team Leader, Sustainable Construction Group at BSRIA examines the latest changes to Part L and asks if we are making progress on the 'performance gap' issue…

The latest changes to Part L of the Building Regulations have been implemented since the beginning of April. The Approved Documents have been available to the industry from the end of last year, and as you might expect, there has been a barrage of articles and a wealth of presentation 'bullet points' to explain the latest requirements and guidance to us all.

Some commentators have pointed out that the aspirational reduction in carbon dioxide emissions is rather smaller than previously envisaged, whilst others have focused on the missed opportunity to require consequential improvements to further improve the performance of the existing building stock. Both have consequences for the stated Government policy and targets for reducing our CO_2 emissions, but perhaps the real miss is the lack of movement on an effective approach to verifying the real performance of the completed building.

How we measure and talk about the performance gap has been the subject of some discussion in BSRIA. In the industry, many start by comparing the actual fuel use with the Part L compliance calculations. A significant variation is then apparent and the design deemed to be failing; but we know that the methods mandated in Part L are for compliance provision, which include a number of assumptions about the use of the building and the efficiency of the systems installed.

If the client wants to understand how the building is going to perform in use, then during design we need to be making assessments of this, and ensuring that they better reflect the expected use of the building. As design and construction progresses, these would need to be updated to reflect all the changes that take place.

The small group of practitioners who are active in reviewing the performance of our buildings quickly identifies that 3 overarching themes occur regularly:

- Communication;
- Responsibility or ownership, and;
- Skills and knowledge.

The Zero Carbon Hub published their latest report on a review of evidence for the performance gap in housing at EcoBuild. The work included an extensive review of published reports and an 'end to end' review of the house building process from concept to completion. The results highlight that the 3 main issues cause problems at each stage of the delivery process.

This work echoes the findings of previous studies in both the domestic and non-domestic sectors. Studies funded under the Technology Strategy Board's Building Performance Evaluation programme have highlighted that when a client organisation understands their own requirements for the building, and when they can clearly communicate these needs to the project team and continue to engage with them during the design and construction of their building, positive outcomes can occur.

If we have a vested interest to improve the energy performance of our buildings then we need to set targets for this, and ensure that someone on both the client and the project team side take responsibility for the delivery of the target. Having agreed a target, this needs to be communicated effectively so that all organisations joining the project understand how their actions can impact on the delivery of the target. Frameworks and processes to help industry with this exist already.

BSRIA has long championed the Soft Landings approach and the government is implementing its interpretation of Soft Landings from April. Simply, Soft Landings is a staged process to help establish targets for the performance of the completed building; reality checking the design as work progresses; preparing for handover, and then staying engaged with the building during its early occupation and for up to 3 years evaluating its performance. The evaluation stage provides the opportunity for fine tuning the performance of the building, demonstrating the business benefits associated with a performing building, and using this learning on other projects.

Part L is changing again and we know that we are on a trajectory to zero carbon buildings by 2016 for homes and 2019 for non-domestic buildings. However, we still have a significant number of challenges to overcome before we can have confidence in our ability to deliver a project that meets the targets.

1 Closing the Gap between Design and As-built Performance, Evidence Review Report, Zero Carbon Hub, March 2014

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