

PROPOSED BUILDING REGULATIONS PART L1A 2010: NHER SUMMARY OF THE CONSULTATION

INTRODUCTION

The Part L 2010 Consultation was published by CLG on 18th June 2009. It seeks views on the proposed changes to Part L (Conservation of Fuel and Power) and Part F (Means of Ventilation) of the Building Regulations that are planned to come into force in October 2010.

This article by Dyfrig Hughes of National Energy Services Ltd (NHER):

- summarises the key changes in the proposed Part L 2010 that affect new dwellings
- describes each of the key changes in a little more depth
- indicates where to look within the 800 pages or so of the documents for those sections most pertinent for newbuild dwellings (the documents covers domestic and non domestic buildings, both newbuild and existing).

Responses to the consultation have to be in by 17 September 2009, using a “response document” supplied within the consultation pack.

THE CONSULTATION DOCUMENTS AND SOFTWARE

The contents of these documents are listed in the Appendix to this paper. They can be accessed on the web via: <http://www.communities.gov.uk/publications/planningandbuilding/partl2010consultation>. CLG have also provided software to use in assessing SAP 2009 and Part L 2010. This can be accessed here: <http://www.2010ncm.bre.co.uk/page.jsp?id=2>

SUMMARY OF KEY CHANGES

Many of the changes aim to:

- more clearly distinguish “Requirements” (the Building Regulations) from “Guidance” (supplementary information in the Approved Document ADL1A). ADL1A has an Introduction (section 1), a section describing the Requirements (section 2) and a section of Guidance (section 3).
- improve compliance so that dwellings when built match the DER figures claimed in submissions to Building Control

There are also a number of changes to both the Regulations and the Guidance, the main ones being:

- Design Submissions to be a requirement (in the Regulations) as well as As Built Submissions
- Software outputs that enable Building Control to check that the design has been adhered to
- CLG are recommending no change to the methodology for calculating the TER beyond the 25% reduction in the target, but do present an alternative approach for consideration / feedback
- The guidance proposes a “strategic sequence” for meeting the TER target
- Confidence Factors – builders to be able to get lower DERs if they adopt procedures that provide more quality assurance e.g. Air Permeability (more pressure testing), Thermal Bridges (use ACDs)
- Secondary heating – dwellings with no secondary heating no longer have to assume on peak electric secondary heating
- Lighting – all fixed low energy lighting is included in the DER assessment (no longer a fixed 30% as previously)
- Design Limits for Building Fabric – no changes
- Design Limits for Building Services - expanded to cover micro-generation of heat and electricity by heat pumps, solar thermal panels, combined heat and power (micro-CHP), wind turbines and solar photovoltaic (PV) panels; Domestic Design Heating Compliance Guide expanded to provide a Building Services Design Compliance Guide.
- Summer overheating – despite the fact that air conditioning can now be modeled in SAP 2009, assessment of mechanically cooled dwellings continues to be as though the cooling were not present
- Clearer rules for air permeability assessment at the As Built stage, involving more pressure testing, a revised sampling methodology and a clear statement about what value to use in untested dwellings.

- Trickle vents also to be sealed when pressure testing.
- Thermal bridging – 25% to be added on to calculated values if accredited construction details not used
- Party Walls – no longer assumed to have a U value of 0.0 W/m²K; value depends upon construction details
- Conservatories – exemption for conservatories of less than 30 m² to be removed
- Swimming Pools – clarification of how to deal with, if within a dwelling.

INITIAL NHER COMMENTS ON THE CHANGES

- The emphasis on ensuring that dwellings when constructed reflect the design specifications and realise the theoretical carbon reductions is very welcome; in particular the requirement for design stage submissions and the tightening up of thermal bridging practice
- The changes to the secondary heating and lighting calculations within the DER may result in a significant proportion of the intended additional 25% reduction in carbon emissions not being realised in practice. This is because these changes will in many cases lead to a significantly reduced DER with little or no change to building practice on site. The same is true to a degree with the cavity party wall change as it assumes that all party cavities currently have poor detailing.

REGULATIONS VS GUIDANCE

What we think of as “the Building Regulations” in practice comprises of three distinct elements: (a) the Building Regulations (2000) and subsequent amendments (b) Approved Documents (ADL1A), for newbuild dwellings) and (c) reference documents.

The first of these, (a) above, is a legal document that sets out the general Requirements.

The second, ADL1A, (b) above, is official Guidance on how to go about complying with the Requirements. It is here that most of the detail about the process of complying is set out. This sets out “what, in ordinary circumstances, would be reasonable provision for compliance with the Regulations”. It is designed to allow alternative approaches where this proves to be necessary. In practice this can mean that elements of the guidance are ignored for convenience or to minimise costs. It is ultimately down to the Building Control Body (BCB) to say what is acceptable and what is not and this leads to variability between the various BCBs. The proposed ADL1A 2010 can be found in Volume 2, Chapter 1, page 3 (see Appendix).

The reference documents are documents referred to either in (a) or (b) above; a key reference document in L1A 2006 is the Design Heating Compliance Guide which sets out minimum acceptable standards e.g. boiler / appliance efficiencies. The updated and expanded version of this, renamed Building Services Design Compliance Guide, can be found in Volume 2, Chapter 6, page 211 (see Appendix).

The Part L 2010 update aims to clarify the distinction between (a) and (b) above. A few items that were previously in the Guidance are proposed to be added to the Regulations.

DEMONSTRATING COMPLIANCE

Part L1A 2006 introduced five criteria for demonstrating that a dwelling complies with the Regulations.

- Criterion 1 - Achieving the TER
- Criterion 2 - Limits on Design Flexibility
- Criterion 3 - Limiting the Effects of Solar Gains in Summer
- Criterion 4 - Quality of Construction and Commissioning
- Criterion 5 - Operating and Maintenance Instructions

These criteria remain in the proposed Part L 2010, with a little refinement.

DESIGN SUBMISSIONS

The current Regulations require a DER and TER for the dwelling as constructed. ADL1A 2006 indicates that a Design stage DER and TER is desirable, but this is not strictly a requirement. It is proposed in the Part L 2010 consultation that the Regulations be amended to “require a design stage TER / DER calculation as part of

plans submission”.

ADL1A 2006 already suggests that checklists be provided to “facilitate for builders and building control bodies the processes of demonstrating compliance with Part L. The checklist prompts for the evidence that needs to be provided to allow the check to be made. As an aid to monitoring during construction and compliance checking two versions of the checklist could be produced, one for the dwelling as designed, the other for the dwelling as built.” However, all approved SAP 2005 software has to produce one of these checklists, in both Design and As Built mode.

The NHER Accreditation scheme has had this two stage process built into its approach since the 2006 Regulations came into force as we are committed to the highest standards of quality assurance. We therefore monitor the work of our Assessors at both the design and as built stage. It is at the Design Stage that the construction of the building can be influenced; it is too late once the building has been constructed.

It is good to see that this approach is now proposed for addition to the Regulations.

The proposed ADL1A 2010 will state “As required by <Regulations>, the builder shall carry out a preliminary calculation before construction starts based on plans and specifications and provide this to the BCB as part of the submission of plans. The results of these calculations and the associated data inputs should be provided to the BCB, along with the specification that corresponds to the claimed performance values”.

A footnote states “The calculation will give an indication of whether a design is compliant and will produce a list of those features of the design that are critical to achieving compliance. This “exceptions list” can be used to prioritise the risk-based inspection of the dwelling as part of confirming compliance with Regulation 17C. The specification will assist the BCB to identify that what is built aligns with the claimed performance.”

SOFTWARE

The proposals make it clear that all calculations must be carried out using approved software implementations of SAP 2009, and that manual worksheets are not adequate. Compliance software will need to produce an output report that will assist BCBs to check that compliance has been achieved. This “exceptions list” will presumably be in addition to the Checklist currently produced.

CRITERION 1: ACHIEVING THE TER

Two options for calculating the TER are proposed.

The Flat 25% Approach

The first approach is based on a simple 25% improvement on each 2006 compliant building. Many developers and housebuilders will be familiar with this as it is the same target used at Level 3 of the Code for Sustainable Homes energy section. However, a 2010 TER will not equate to the corresponding 2006 TER reduced by 25%, as the calculation will be based upon revised emission factors in SAP 2009. This approach has the disadvantage that it may not eliminate the so-called “code 4 loophole”, whereby electric heat pump solutions can achieve the TER using fabric solutions that are less demanding than for a gas heated dwelling. The proposed change to the CO₂ emission factors will however help to ameliorate this problem. The so called “Flat 25%” approach is the government's preferred approach to the 2010 TER.

The Aggregate 25% Approach

The second approach involves a change to how the TER is calculated, although this would be invisible to users. The aim is to address concerns that the current approach (a) disadvantages rural communities that are off the gas grid and (b) encourages the use of low carbon heating fuels such as wood in buildings with relatively poor energy efficiency. The idea is to move away from each individual building having to achieve a 25% improvement; instead the 25% would be achieved across all building types.

There is no fuel factor in the Aggregate 25% approach. Instead, a number of ‘template’ dwellings are created for various fuel types, similar to the approach taken for the Scottish TER. Higher fabric standards are required for dwellings with electrical resistance heating. Different heating system efficiencies are assumed for biofuel and electric heat pumps. A more detailed explanation of the Aggregate 25% TER calculation can be found within Volume 2, Chapter 5, pages 200 to 207 (see Appendix)

This approach is not the Governments preferred option.

Difference in TER / DERs between 2006 and 2010

The overall aim is to achieve a 25% reduction in carbon emissions as compared with the 2006 Regulations. The table below gives an indication of the difference in TER and DER seen on a typical 2 storey detached house with a total floor area of 135 m², a condensing boiler with good controls, a secondary condensing gas fire, natural ventilation and just meeting the 2006 Regulations. The figures were produced by NHER using the CLG consultation software. They suggest that it is much easier to meet the Aggregate 25% target in this typical house than it is to meet the Flat 25% target and that the CO₂ reduction required is nearer 15 % than 25%. This is an aspect of the proposals than needs much closer examination.

		2006	2010 Flat 25%	2010 Aggregate 25%
1	TER	19.71	17.13	18.63
2	DER	19.67	21.59	21.59
3	DER - TER	0.04	4.46	2.96
4	Reduction in TER in 2010	N/A	2.58 (13.1%)	1.08 (5.5%)
5	(DER – TER) / 2006 TER %	N/A	22.6%	15.0%
6	DER – TER) / 2010 TER %	N/A	26.0%	15.8%

1. The Aggregate TER is an easier target to meet in this gas heated semi detached house
2. The DER is substantially higher in 2010 than 2006, reflecting the increased CO₂ emission factors
3. This value is approximately the CO₂ emission reduction per m² due to the 25% target reduction in TER
4. The reduction in TER from 2006 to 2010 without correcting for the increased CO₂ emission factors
5. The approximate CO₂ reduction / m² (i.e. the DER – TER) as a % of the 2006 TER
6. The approximate CO₂ reduction / m² (i.e. the DER – TER) as a % of the 2010 TERs

Strategic Sequence

The revised guidance proposes the following strategic approach to meeting the TER target:

- a) reduce the energy demands
- b) meet the remaining energy demands with high efficiency systems that are well controlled and properly commissioned; then
- c) use a mix of energy supplies and/or renewable energy systems that deliver a low overall carbon impact; and finally
- d) provide appropriate operating instructions and energy monitoring facilities, enabling occupiers to effectively manage their use of energy so as to reduce operating costs and environmental impact.

Secondary heating

In Part L 2006, dwellings with no secondary heating were assumed to have 'on peak' electric secondary heating. This has been changed in the proposed Part L 2010, so that in this case all heating is assumed to come from the main heating. In the sample dwelling we looked at, this alone has the effect of reducing the DER by over 6%. The assumptions for unconnected gas points and for open chimneys with no fire remain the same.

Lighting

In Part L 2006, the proportion of fixed low energy lights is always taken as 30% in the DER calculation. A minimum number of fixed low energy fittings is stipulated. Fixed is defined as "fittings ... that only take lamps having a luminous efficacy greater than 40 lumens per circuit watt." And "GLS tungsten lamps with bayonet cap or Edison screw bases, or tungsten halogen lamps would not.. (meet this standard)".

In the proposed Part L 2010, all fixed low energy lighting is taken into account in the DER calculation, so that lighting becomes 'tradable' against other measures. The minimum amount that would be reasonable provision in the actual building is given in the updated Domestic Building Services Design Compliance Guide. Here it states that three out of four fittings must be low energy. However, the definition of "fixed" now includes "standard fittings supplied with low energy lamps..(e.g. bayonet or Edison screw base compact fluorescent lamps)."

In the sample dwelling we looked at, moving from 30% to 100% low energy lamps has the effect of reducing the DER by around 7%.

Confidence Factors

A stated principle within the Part L2010 consultation is that builders should be able to get lower DERs if they adopt procedures that provide more quality assurance.

A good example of this is that, in the DER calculation, the estimated heat losses from thermal bridges will be lower for a given design if the developer has adopted Accredited Construction details. Similarly, the assumed air infiltration will be lower, the more pressure testing the developer does on site. Good practice in cavity party walls will also lead to lower assumed heat losses.

In addition, in the finalised Part L 2010, there may be a reduction in assumed efficiencies of building services systems to reflect the latest research on operational efficiencies.

CRITERION 2 - LIMITS ON DESIGN FLEXIBILITY

“Criterion 2 - Limits on Design Flexibility” provides a way of demonstrating the requirement in Regulations that “reasonable provision should be made to limit heat gains and losses through the fabric of the building” and that “energy efficient building services and effective controls should be provided”.

Building Fabric

In ADL1A 2006, upper limits are set for area weighted average U values, as follows: Roof 0.25 (W/m²K); Wall 0.35; Floor 0.25; windows, roof windows, glazed rooflights, curtain walling & pedestrian doors 2.2. Also, an upper limit of 10.0 (m³/hm² @50 Pa) is set for the measured air permeability.

In the proposed ADL1A 2010, these values are unchanged. The emphasis instead is on reducing the heat loss via party walls, improved thermal bridging and better system efficiency improvements.

Fixed building services

Part L1A 2006 restricts itself to setting design limits for heating, hot water, mechanical ventilation, mechanical cooling and lighting. It is proposed that the Regulations be amended to include (renewable) energy generation equipment, power distribution systems and (natural) ventilation components.

The proposed ADL1A 2010 wording is also more flexible than in 2006, so as not to inhibit innovation. “Each fixed building service should be at least as efficient as the worst acceptable value for the particular type of appliance as set out in the Domestic Building Services Design Compliance Guide. If the type of appliance is not covered by the Guide, then reasonable provision would be to demonstrate that the proposed system is not less efficient than a comparable system that is covered by the Guide”.

The consultation package includes an updated version of the Design Compliance Guide. This runs to 100 pages and can be found in Volume 2, Chapter 6, page 211. It now includes microgeneration of heat and electricity by heat pumps, solar thermal panels, combined heat and power (micro-CHP), wind turbines and solar photovoltaic (PV) panels.

CRITERION 3 – LIMITING THE EFFECTS OF SOLAR GAINS IN SUMMER

There are few changes to “Criterion 3 – Limiting the Effects of Solar Gains in Summer”, apart from the changes in the underlying calculations within SAP 2009.

ADL1A 2010 clarifies the situation with mechanical cooling as follows: “ If the dwelling has mechanical cooling, the assessment should be based on the design without the cooling system operating, but with an appropriate assumption about effective air change rate through openable windows.” There was similar wording in ADL1A 2006, but it was less important then as there was no option available to model air conditioning systems as there is in SAP 2009.

There is an additional note regarding daylighting: “ As a general guide, if the area of glazing is much less than 20% of the total floor area, some parts of the dwelling may experience poor levels of daylight, resulting in increased use of electric lighting”.

CRITERION 4 – QUALITY OF CONSTRUCTION AND COMMISSIONING

The aim here is to ensure that the dwelling As Built is consistent with the DER. This section has been expanded and strengthened in a number of ways. The key things covered are:

- Party Walls
- Thermal Bridging
- Air Permeability
- Commissioning of Building Services

Party Walls

In SAP 2005 / Part L 2006, party walls were assumed to have a U value of 0.0.

In SAP 2009 / Part L 2010, the following assumptions are made in the calculation:

- Solid 0.0
- Unfilled cavity with no effective edge sealing 0.5
- Unfilled cavity with effective sealing around all exposed edges and in line with insulation layers in abutting elements 0.2;
- A fully filled cavity with effective sealing at all exposed edges and in line with insulation layers in abutting elements 0.0.

The guidance provides more details that are given in the SAP 2009 documentation about what needs to be achieved for the lower U values to be acceptable.

The notional dwelling used for the TER calculation has been defined in such a way that the benefit of reducing the U value of a party wall is seen in the 2010 DER calculation.

Thermal bridging

Much more careful attention to thermal bridges is proposed in Part L 2010.

Builders will have to “demonstrate that an appropriate system of site inspection is in place to give confidence that the construction procedures achieve the required standards of consistency”.

Ways of demonstrating that reasonable provision has been made are:

To adopt an accredited construction details approach

“The details published via such scheme(s) have accredited linear thermal transmittance values associated with them, and these values can be used directly in the DER calculation; Such scheme(s) also accredit details in terms of buildability, and have an associated quality assurance regime scheme that inspects a sample of sites to confirm that the details are being implemented correctly.” There is a 75 page paper in Volume 1, Chapter 3, page 40 setting out detailed proposals for Accredited Construction Details.

To use the builder’s own details

“In this case, the linear thermal transmittances should be calculated by a person with suitable expertise and experience following the guidance set out in BR 497. When used in the DER calculation, the values so calculated should be increased by 25% because there is no independent assessment of robustness, and no historical evidence that the expected performance will be realised in practice. To assist with buildability, builders following this route must also provide a process flow sequence, indicating the way in which the detail should be constructed..... Possible changes to the local authority building control charging regime could mean that adopting this route may attract higher building control fees than the alternative approaches.”

“The above alternative approaches are not mutually exclusive. For example, a builder could use accredited construction details for the majority of the junctions, but use a bespoke detail for the window head. In this case, the 25% margin would apply only to the thermal transmittance of the window head detail.”

CLG is seeking feedback on (a) the proposed 25% margin and (b) how those individuals carrying out thermal

bridge performance calculations could be formally accredited.

Default 'y values'

"In such cases a conservative default y-value of 0.15 must be used in the DER calculation". There is no suggestion of working out lower 'y values' than 0.15, as was indicated in the SAP 2009 consultation.

Air Permeability

There are a number of welcome changes to the guidance around air permeability. As this is currently a confused area, these changes are brought together and reproduced here (slightly abridged).

Terminology

The terminology has been clarified as follows:

- Limiting air permeability - the worst allowable air permeability.
- Design air permeability - the target value set at the design stage, and must always be no worse than the limiting value.
- Assessed air permeability - the value used in establishing the DER, and is based on a specific measurement of the dwelling concerned, or on measurements of other dwellings of the same dwelling type.

Air Permeability Value of untested dwellings at the As Built stage

When a dwelling has been pressure tested, the assessed air permeability is the measured air permeability;

For a dwelling represented by this pressure test, and which has not itself been tested, the assessed air permeability is the average result obtained from other dwellings of the same dwelling type tested on the development increased by a margin of +2.0 (m^3/hm^2 @50 Pa)

Otherwise (e.g. on small developments), the assessed air permeability is 15.0

The outcome of this change is that the design air permeability should be at most 8.0, so that untested dwellings should achieve an assessed air permeability less than the limiting value of 10.0

Definition of Dwelling Type for Pressure Testing

In Part L 2006, this definition was left to the ATTMA publication "Measuring Air Permeability of Building Envelopes". A similar definition is now incorporated within ADL1A 2010, and (subject to consultation feedback) will be made consistent in the ATTMA guidance.

The main differences to the current ATTMA definition are:

- Addition: "have similar adjacency to unheated spaces such as stairwells, integral garages etc;"
- Amendment: " have the same principal construction details (as identified by the ACD or bespoke detail reference codes)"
- Amendment: "have envelope areas that do not differ by more than 10%" (currently it is floor area not envelope area)

Procedure regarding trickle vents when Pressure Testing

Trickle ventilators should now be temporarily sealed rather than just closed. This is because they are designed to provide some background ventilation even when closed.

Volume of Pressure Testing

There is a general doubling of the volume of Pressure Tests required. For example, dwellings that have not adopted Accredited Construction Details will need pressure tests of two units of each dwelling type, where the number of dwelling types is 4 or less. This compares with one test currently.

Commissioning of Building Services

Commissioning now refers not only to heating and hot water systems but to all fixed building services. "Reasonable provision would be to prepare a commissioning plan, identifying the systems that need to be tested and the tests that will be carried out."

CRITERION 5 – PROVISIONS FOR ENERGY EFFICIENT OPERATION OF THE DWELLING

The main addition in this section is as follows:

"The data used to calculate the TER and the DER should be included in the log book." Presumably this refers to the SAP Data Input sheet.

"The occupier should also be provided with the recommendations report generated in parallel with the "on-construction" Energy Performance Certificate. This will inform the occupier how the energy performance of the dwelling might be further improved.

It would also be sensible to retain an electronic copy of the TER/DER input file for the energy calculation to facilitate any future analysis that may be required by the owner when altering or improving the building."

SPECIAL AREAS

The following three areas are not covered under any of the 5 criteria and so are discussed separately in the consultation:

- Conservatories
- Swimming Pools
- Common Parts

Conservatories

Currently, conservatories are dealt with as though they were not there. Unless there is no thermal separation between the conservatory and the dwelling, in which case it is included within the thermal envelope of the dwelling. AL1B 2006 covers the construction of the conservatory itself. Conservatories of floor area not exceeding 30 m² (i.e. most of them) are exempt from the Building Regulations.

It is proposed that the 30 m² exemption for conservatories be removed from the Regulations.

A definition of a conservatory is also to be included, as follows:

"A conservatory is an extension to a building:

- a) which is thermally separated from the attached building by walls, windows and doors with U-value and draught-stripping provisions no worse than provided elsewhere in the building, and if a heating system is provided, that system has independent temperature and on/off controls;
- b) where the area of transparent or translucent material in its external envelope parts is more than 150% of its floor area."

Swimming Pools

The guidance describes how to deal with swimming pools included within the thermal envelope of a dwelling. They are essentially ignored in the SAP calculation and replaced with an area with the U value of the surrounding floor.

Common Parts

Common areas of buildings containing multiple dwellings continue to be classified as non dwellings, and are treated in a similar way to previously.

APPENDIX

CONSULTATION DOCUMENTS

The consultation document is presented in three volumes. The key documents in our view are identified below by a **, other important ones by a * and other relevant material by a +:

Volume 1: Proposals for amending Part L and Part F Building Regulations

Summary of Consultation +

Chapter 1 – Introduction *

Chapter 2 – Proposals for Improving compliance and building performance *

Chapter 3 – Proposals for Accredited Construction Details (ACD) *

Chapter 4 - Training and dissemination strategy *

Chapter 5 - Future Thinking Paper *

Annexe A - Consultation criteria +

Annexe B - Consultation stage Impact Assessment +

Annexe C - Response form **

Volumes 2: Technical Guidance on Part L

Chapter 1 – Proposed ADL1A – new dwellings **

Chapter 2 – Proposed ADL1B – existing dwellings

Chapter 3 – Proposed ADL2A – new buildings that are not dwellings

Chapter 4 – Proposed ADL2B – Work in existing buildings that are not dwellings

Chapter 5 – Proposed changes to National Calculation Methodology *

Chapter 6 – Proposed Domestic Building Services Compliance Guide *

Chapter 7 – Proposed Non Domestic Design Compliance Guide

Volume 3 - Technical Guidance on Part F

Chapter 1 – Proposed ADF - Means of ventilation +

Chapter 2 – Proposed Domestic Ventilation Installation and Commissioning Guide +

DOMESTIC BUILDING SERVICES DESIGN COMPLIANCE GUIDE

This 100 page document provides “detailed guidance for persons installing fixed building services in new and existing dwellings to help them comply with building regulations. It covers work on both new systems and replacement systems, identifying the differing requirements where these exist.” It can be found in Volume 2, Chapter 6, page 221.

This edition of the guide covers:

Fuel-based sections:

Section 2: Gas-fired primary and secondary space heating and hot water

Section 3: Oil-fired primary and secondary space heating and hot water

Section 4: Electric primary and secondary space heating and hot water

Section 5: Solid fuel primary and secondary space heating and hot water

Technology-specific sections:

Section 6: Community heating

Section 7: Underfloor heating

Section 8: Mechanical ventilation

Section 9: Heat pumps

Section 10: Comfort cooling

Section 11: Solar water heating

Section 12: Lighting

Section 13: Micro-combined heat and power

Section 14: Wind turbines

Section 15: Photovoltaic panels

Section 16: Heating system circulators