Part L1B & What you need to know to get your building to pass.

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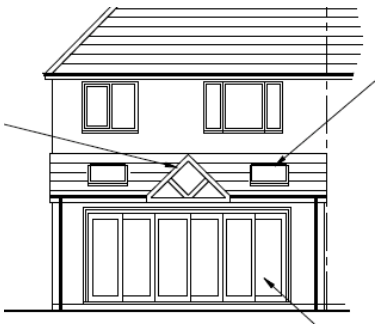

The Building Regulations Part L1B – what they are, how they affect your building design, and what you need to know.

Part L1B and what you need to know to get you building to pass

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"If at first the idea is not absurd, then there is no hope for it" - Albert Einstein

1.0 Introduction

I like the quote above because when I first thought about trying to write this series of books, I thought it was slightly bonkers to try and summarise the whole process, and also I didn't want to just repeat what was written in the manuals. It also became clear to me that many people get confused by what they are being asked to provide in order to comply with the Part L, and also that as an assessor, we have requirements for information that will help both the client and ourselves to complete the calculation in the most time and cost effective way and still achieve the best results for the building – a lot of this is down to the quality of the information supplied. This book will hopefully make the whole process of what is required, the information needed to carry out the calculations, and make L1B a lot easier to understand.

Do any of these sound familiar to you?

- If you are an architect and you are asked by Building Control to provide an L1B calculation, do you know what they mean?
- If you are a Building Control officer do you know what is actually required when you ask for a calculation to demonstrate compliance with L1B
- Do you know what buildings actually require an L1B calculation?
- Do you know what energy assessors actually do, and what information they need to carry out the calculations?
- What is an L1B calculation and why do I need one?
- What is different between an L1B calculation and a SAP calculation?

If you answered "No" or 'Don't know" to any of the questions above you are not alone, and the purpose of this book is to answer those questions and many more you may have too.

In fact the aim of this book is simple, to explain the main requirements of Part L1B, how this links in with SAP, how we demonstrate compliance for L1B, and what information the building designer will need to supply to an approved assessor in order to carry out the calculation. Finally, and perhaps most importantly for you if you are the building designer, it will cover what impacts the design the most in terms of gaining a pass.
Its not a step by step on how to pass the regulations, every building is different and to try to give examples of each would be impossible.

On a final note, writing this type of document whilst interesting, could as easily be as dull as ditchwater, so baring that in mind I have tried to make it an easy read, and I make no apologies for my sense of humour!

2.0 Who or what is an Approved Assessor?

Assessors have to complete a training course using their chosen SAP modelling tool, pass an exam, submit a number of properties for assessment, and once passed can practice as an approved assessor. They must also belong to an Approved Accreditation Scheme and follow each scheme Code of Conduct, have appropriate insurance, and carry out a prescribed number of hours of Continuing Personal Development each year.
Once qualified to provide SAP calculations and Energy Performance Certificates it is possible to top up with further training that covers the requirements of Part L1B, some of which requires the use of the SAP tool, whilst other aspects do not.

3.0 Who am I?

I have been producing calculations and reports for all aspects of Part L for a number of years, and work with Architects and Building Control bodies providing guidance and training in all aspects of Part L, and also work with them to help clients gain compliance. It's important to me that the result is the best that is achievable, and not just a pass to gain compliance minimums, if you are going to do the job you may as well do it to the best possible standard.

I am qualified to produce L1B calculations because I am a qualified On Construction Energy Assessor & SAP Assessor. I have worked on hundreds of buildings of all types, from small two room extensions, houses and flats to very large office buildings and factories. I am a commercial building assessor able to produce SBEM calculations and compliance with L2A & L2B. I am also a Public Building Assessor able to produce Display Energy Certificates (DEC's), and a qualified Code for Sustainable Homes Assessor.

This book is the forth of a four part series covering all four sections of Part L compliance, namely – Part L1A new domestic buildings, Part L1B, existing domestic buildings, Part L2A new build non domestic buildings, and Part L2B existing non domestic buildings. This book concerns Part L1B only.

4.0 What is Part L1B?

Part L1B is one part of the four parts to Part L of the Building Regulations – Conservation of Fuel and Power in existing dwellings.
This book concerns the requirements of the October 2010 Regulations, and will be updated as the Regulations are changed, the next due at time of writing in 2013.

The Regulations and how to comply with them are contained in an Approved Document, ADL1B, there are other ways of demonstrating compliance with the Regulations but in terms of the most straightforward, following the guidance in the AD is the simplest.

The Regulation itself is straightforward, and in fact to comply with Part L1B there are 3 sections referred to:
Regulation 4A – Thermal Elements – if an element is replaced it should meet the minimum requirements, and if new it should also meet minimum requirements of thermal efficiency.
Regulation 17D – applies to existing buildings with a total useful floor area of over 1000m2 where the proposed work consists of an extension, initial provision or increased capacity of any fixed building services.
Regulation 17 E – Where appropriate an Energy Performance Certificate (EPC) should be provided.

I will cover what each of those means in detail in the relevant section later on, but to say for now that by following this guidance, all those Regulations are covered.

There are also the specific requirements of Part L – Reasonable provision shall be made for the Conservation of Fuel and Power in dwellings by:
"Limiting heat losses and gains, providing fixed building services which are energy efficient, have effective controls that are commissioned and tested, provide the owner with sufficient information about the building and the fixed services so that the building can be operated to use no more fuel and power than is reasonable".

5.0 What buildings are covered in L1B?

5.1 Inclusions

We are talking about residential dwellings here remember, so the following circumstances will determine the need for complying with L1B.

1. Construction of an Extension

2. A material Change of Use, or a change to the buildings Energy Status, including loft and garage conversions

3. The provision or extension of Controlled Services of Controlled Fittings

4. The replacement of a Controlled Services of Controlled Fittings

If a building is part dwelling and part commercial, or is a number of dwellings with a common area, like a common corridor and stairwell in flats for example, any work covered by Part L1B is applicable to the single dwellings only, and the commercial and common areas will be subject to the requirements of Part L2B.

The energy efficiency requirements of the Building Regulations Part L1B apply to extensions dwellings or carrying out any building work to an existing dwelling or to an extension to an existing dwelling.

5.2 Exclusions

There are a number exemptions to the Regulations, and they are important ones too because they have a major impact on what can and cannot be undertaken. In my mind they have too much emphasis on the final result, restricting many measures that could feasibly be undertaken without a detrimental effect on the existing building. But that's an argument that is for much longer debate than space will allow here.
Exemptions:

1. Listed Buildings

2. Those in a Conservation Area

3. Scheduled Ancient Monuments

For these to be exempt the energy efficiency measures as proposed would have a detrimental effect on the character or appearance of the building.

4. Carports, covered yards & ways and some conservatories & porches.

There are a few other buildings that are exempt if it's agreed that they should be under special considerations, these are:

5. Buildings of a special architectural interest if referred to as such in the Local Authority Development Plan or Framework.

6. Buildings of architectural interest within National Parks or Areas of Outstanding Natural Beauty, registered historic parks & gardens etc.

7. Buildings of traditional construction with permeable fabric that both absorbs and readily allows evaporation of moisture.

Essentially if your building is any of the above the likelihood of being able to do much with it in terms of improving its energy efficiency, particularly with regards to the building fabric, is highly unlikely. And you can almost certainly forget about installing any building mounted renewables like solar thermal or PV, although changing the lighting and the boiler may be an option.

Any improvement to energy efficiency work that is carried out on the existing building should be done as far as reasonably practicable, but in reality this can be very little, depending on who the Conservation Officer is and their view of what is practicable.
If a new extension is added to an existing building of this type then that usually must meet all requirements of Part L1B, unless in doing so the character of the existing building would be prejudiced.

In all work undertaken on the above type of building, English Heritage have guidance as to what should and should not be undertaken, and its probably best to familiarise yourself with that information before talking to both the Conservation Officer and Building Control. If it were a boxing match between the two, it would be the Conservation Officer going home with the medals every time.
For more information from English Heritage:
http://www.english-heritage.org.uk/professional/advice/advice-by-topic/buildings/

5.3 Conservatories and Porches
If the conservatory is under 30m2 and where the walls, windows and doors that separate it from the rest of the main house are retained then it's exempt. If the walls, windows or doors are removed and replaced by others that meet the energy efficiency requirement s, and where the heating system of the main house Is not extended into the conservatory, then its exempt too. Oh, for porches it's the same as a conservatory.

If the conservatory or porch is not exempt then there are a few things that must be done to ensure compliance. The first thing is to establish if it's a conservatory and not an extension. For it to be a conservatory it must have a minimum of 50% of the walls glazed, and 75% of the roof glazed, otherwise it's an extension.

It should also be separated thermally from the rest of the house, i.e. with external quality doors, it should have independent heating and controls for that heating, and the thermal elements should meet the minimum requirements as in Table 1 below.
If a new conservatory is open to the rest of the house, or if heating from the rest of the house is extended into it, it essentially becomes a very highly glazed extension in practice, and you are going to have to come up with some serious consequential improvements to the rest of the house to make up for the additional heat losses, as well as ensuring that each thermal element meets the minimum requirements in Table 1, and that the heating also complies with the minimum requirements.

My advice in terms of the Regulations and conservatories is that keeps them separated and don't heat them, and use them in the summer as intended. If you really want to have one to extend the living area of the house all year round, make it an extension. This way you will have a construction that better suits our climate and it wont get too hot in summer or too cold in winter.

6.0 What is actually required to gain compliance – The details.

6.1 Thermal Elements

There are various ways of demonstrating compliance with L1B, the first called the Reference Method, the most common for extensions, and its where you show that the fabric standards meet the minimum requirements. So there are minimum U Values that need to be achieved for the walls, floors and roofs, as well as the windows, doors and roof lights. This applies to both new elements, and for those that are being replaced. The thing to check is that the replacement and new values are the same, but improving an existing element is different and it depends on whether it is currently above the minimum threshold acceptable before improvements must be made, see the table below.

It's quite common that in reality some existing elements, especially ground floors, do not need to be upgraded at all, at least on an elemental level. Although there are circumstances where the whole building result may benefit from doing so if practicable.

Thermal Element	New & Replacement Minimum	Threshold- If existing element is worse than:	Improvement Minimum
Cavity Wall	0.28	0.70	0.55
Solid Wall	0.28	0.70	0.30
Pitched Roof – ins at ceiling	0.16	0.35	0.16
Pitched roof – ins at rafter	0.18	0.35	0.18
Flat roof	0.18	0.35	0.18
Floors	0.22	0.70	0.25
Swimming pool basin	0.25	n/a	n/a
Windows	1.6	n/a	n/a
Rooflights	1.6	n/a	n/a
Glazed doors	1.8	n/a	n/a
Solid doors	1.8	n/a	n/a

Table 1 – New, Replacement & Improvement minimum U Values for Thermal Elements & Controlled Fittings

6.2 The Provision of Thermal Elements

All U Values need to be calculated following the conventions in BR443. This is because by following the conventions the appropriate corrections and calculation methods are used, I have seen many calculations not carried out this way and the difference can be significant, so ensure a competent person provides all the U Value calculations. As a matter of course I always carry out my own and never rely on any one else's .

If a new or replacement thermal element is to be constructed it must meet the minimum values in Table 1 above.

6.3 Continuity and Air Tightness

Although there is no requirement to air test an existing building, or to achieve any air permeability figure, unlike new builds, reasonable provision would be to ensure the design allows for a continuity of the thermal insulation, and if possible to utilise Accredited Construction Details (ACD's) for the new elements. In reality ACD's are very unlikely to be used, they rarely are in new builds let alone existing ones, designers preferring to design their own junctions instead which is quite acceptable.

For more information, see our website for more details:
http://www.energy-saving-experts.com/residential/guidance-papers/

6.4 Renovation of Thermal Elements
This means the provision of a new layer, for example cladding or rendering, or dry lining of an existing thermal element. Replacing an existing layer means either stripping down the element to expose the basic construction, i.e. brickwork or timber frame, and then rebuilding to achieve the required thermal performance. It also includes replacing a waterproof membrane on a roof.
In terms of performance it should meet the minimum overall U Values as detailed in Table 1. If the existing U Value is better than the threshold it does not necessarily need replacing/upgrading, if it is worse, then it does. At least that what it says in ADL1B, however, in reality to able to achieve the overall result the element may need to be improved.

Also, the area to be upgraded should be greater than 50% of the total surface area of the individual element, or 25% of the total building envelope. If a solid wall is being dry lined, only the section that is an external wall needs to meet the minimum values, not the whole wall, but still over 50% of that external section.

What does this mean? If a roof of an extension is being stripped down, it's the area of the extension, not the roof area of the whole dwelling. If a rear wall of a single storey extension was being re-rendered, it should be upgraded to the minimum values in Table 1, even if it was less than 50% of the total building area as viewed from the rear.

6.5 15 year payback
This is the old chestnut used to get away without upgrading an element. Sometimes its just not technically possible or feasible to upgrade an element, which is easy to identify and usually common sense prevails. The payback is where the cost of implementing something is greater than the savings produced by doing so and would take longer than 15 years to achieve a payback. Dry lining a whole dwelling of solid walls could fall into this category quite easily, however, there is provision, as listed in Appendix A of ADL1B, that allows for a lower U Value than that listed in Table 1 in order to make some improvements, whilst still coming within a 15 year payback. This is difficult to prove what would be 15 years payback, in terms of the actual cost of carrying out the work, although the calculation: Costs / Savings is easy to work out.
What is required is an estimate of the reasonable cost, both for materials and the cost of installing them, but not associated costs like scaffolding, and the cost of energy supplied to the building, based on the fuel costs provided by DECC each quarter and then we get busy with the calculator!
Use the following link for full details:
http://www.decc.gov.uk/en/content/cms/statistics/publications/prices/prices.aspx

6.6 Retained Thermal Elements
Retained thermal elements are those in an existing building that will be retained and will become part of the external envelope where previously it was not, and also where an external thermal envelope is part of a building subject to a material change of use.
The guidance is simple, if its worse than the threshold value it should be upgraded to meet the minimum values as in Table 1, unless to do so it would have a longer payback than 15 years, in which case a lesser provision may be made, although generally this should not be worse than the threshold value of 0.7 W/m2.

6.7 Controlled Fittings
Controlled fittings are the windows and doors, including the frames. If just the glazing is replaced in a fitting as part of the work then it is outside the scope of the ADL1B.

If any windows and doors are replaced or newly installed into an existing building they should meet the minimum values as described in Table 1, and where appropriate insulated cavity closers should also be installed.
If the minimum values cannot be achieved due to mitigating factors, like maintaining appearance etc, then a centre pane U Value of 1.2 W/m2 should be achieved, or if single glazing then it should be supplemented with low-e secondary glazing.

If a U Value is not available but the WER (Window Energy Rating) is, the minimum standard is to achieve Band C.

I often get provided with centre pane U Values, and have to go back and ask for the whole unit U Value as in most cases this is what is required. To date I have never just been given the WER figure.

The area of glazing should not exceed 25% of the floor area unless compensating measures are included elsewhere in the work. For extensions it is deemed reasonable to have a maximum area of glazing not exceeding of 25% of the extension floor area, plus the area of any closed up or no longer exposed glazing as a result of building the extension.
What this means is that we measure the floor area of the extension, then measure the area of the proposed glazing, plus any closed openings, and this figure should not be more than 25% of the floor area. If it is, and it almost always is because everyone wants large glazed doors right across their extension and some roof lights too, then the heat losses are going to be too high, and they will have to be made up for elsewhere, or the glazing U Value will need to be improved. Its usually unlikely that those additional heat losses can be made up for within the construction of the extension, so its going to be something that needs to be done on the existing part of the property. This is known as Consequential Improvements, of which more later on.
On the flip side to that, if the glazing area is anything less than 20%, it may be that the exposure to daylight is too low, resulting in the need for more electric lighting.

7.0 Demonstrating Compliance

7.1 Submissions and Competent Persons
If you plan to build an Extension, carry out a Change of Use or Renovate a building then its best to notify Building Control at least 5 days before any work is started. On top of that if you want to ensure compliance with Part L1B then I would strongly suggest that all calculations are carried out and submitted to Building Control long before any work on the ground is started. Building Control will probably ask for these anyway and besides its best to ensure that, on paper at least, what you plan to do complies, otherwise you risk some very expensive changes if its left until after the build is completed before any compliance check is made.

I mentioned earlier about competent persons, in this context Part L1B reference to competent person are gas fitter and electricians for example, who, once the work is complete, will submit a certificate of completion which Building Control will accept without further question. This is because they are members of a scheme that ensures they can carry out the work safely and properly.
In terms of energy assessors, we are also covered by similar type schemes, which means that our calculations and reports can be accepted by Building Control as evidence of complying with the Regulations. That said, we can only base our work on the information provided by the client, Building Control will be responsible for checking that what was planned actually was installed. Assessors also use the calculations and reports to demonstrate compliance, before work is started and also in some instances once work is completed. If it's

a Change of Use, a house to flats or vice versa, not only will Building Regulations be required, but also this is when an Energy Performance Certificate (EPC) would be required. For extensions only, its unlikely an EPC would be required at all. Its really important that an accurate calculation is carried out before work starts so that everyone, the builder, the electricians etc know exactly what it is they need to do in order to comply.

There are a few instances where notification does not need to be given, where work has been done because of an emergency for example, or where there is no health and safety risk associated to it. Things like installing a stand-alone fixed electric heater, or upgrading/installing loft insulation would be exempt from notification.

7.2 Standards of Materials & Workmanship
There are references throughout ADL1B to named standards or schemes, and there are other schemes where products will be required to meet their particular standards, HETAS for example for wood burning stoves. In all cases if it's a standard or scheme referred to the proposed work must meet those standards, and likewise if a product states it meets a particular scheme standard, Building Control should ensure that the scheme in question is a valid one that meets the requirements of the Regulations.

7.3 Ways of demonstrating Compliance
7.31 Reference Method
The Reference method is purely demonstrating that the above performance requirements for thermal elements and controlled fittings are within the limits set in Table 1 above.

7.32 Areas Weighted U Value calculations
Other ways of demonstrating compliance is area weighted u value calculations, again usually for extensions, but its used with a Material Change of Use too, this way if one element is slightly out, or because the building has maybe Listed Status or some other reason why a measure cannot be implemented, like its not cost effective to do so, showing an area weighted u value calculation which compares the as designed extension to one that elementally meets the regulations can help show compliance. The trouble is, often this is not enough either.

7.34 Heat Loss Calculations
This isn't explicitly listed in the document but it is an option and one I use all the time. This is where a calculation is done to show the heat losses from the as designed extension or whole dwelling, elementally and area weighted, and compared to an extension or whole dwelling (the Notional) that elementally meets the Regulations. The as designed should be better, as in lower than the Notional.

7.35 Whole Dwelling Method
This is used rarely for extensions, although a lot for renovations and Change of Use, and is when SAP2009 is used to calculate the CO2 emissions for the entire building as designed, and compared to a full SAP of an identical building, the Notional, that elementally meets the regulation minimum requirements for thermal elements, controlled fittings and controlled services. This calculation includes the existing dwelling as well as the extension, and the glazing in the Notional building must be no more than the 25% of the floor as mentioned above.

In reality what I do for an extension is I demonstrate the first three all on 1 page of a report. It's beneficial to see that each element on its own meets the minimum requirements as in Table 1. You really should meet this requirement first as at least you are showing that the basic design is within the Regulations.
I show an area weighted U value calculation of both the as planned extension and a Notional one to compare, as this identifies where any improvements may need to be made where one element or more is not performing high enough. This is useful when you are combining both new and upgraded existing elements, or where an existing element cannot be upgraded due

to financial payback is to long, or that the building has conservation or listed status meaning an existing part cannot be upgraded, or a new element must first conform to visual appearance and to do so it cannot meet the minimum requirements.
I also show heat loss calculations, which is the area of each element multiplied by its U values, and compare the as designed to the Notional, to see if there is a short fall. This is probably the most useful because it provides a very clear way of showing how the new extension is going to perform, in terms of heat losses, compared to how it should perform if it was meeting the Regulations minimums. Its here that it's very apparent if something else needs to be done.

In most cases there is a shortfall, usually due to over glazing, the area of which I also show in the Submission report, in which case something else will need to be done to make up for those additional heat losses.

See sample report in Appendix 1

7.4 Material Change of Use
This is where a building is used as a dwelling, when previously it was not , or where it was a whole dwelling that is now converted into flats, or where it was a number of flats and its been converted into a single dwelling.

7.5 Change of Energy Status
This is where there has been a previously unheated building and it is now heated, or where a Material change of use has occurred that has resulted in a change to the energy status, which in likelihood is almost always. It could also be where a previously exempt building no longer is because the energy status has changed for reasons as above.

The way to demonstrate compliance is really the same as that highlighted above for an extension. The difference is that in almost all cases is that a full SAP2009 will be completed for the building as designed, and another one for the building as designed but meeting the minimum requirements for thermal elements, controlled fittings and controlled services, the Notional Building. The result required is that the actual building C02 emissions are equal to or lower than the Notional building.
In all respects the minimum requirements as set out above for extensions also apply for a material Change of Use or Change of Energy Status, and it's the overall CO2 emissions, which is the important figures that need to be submitted to Building Control.

This is where, often building Control ask for a SAP calculation on an existing building, its not a SAP calculation that is carried out in terms of demonstrating the DER/TER, but it is a SAP calculation, using the SAP software, to show the CO2 emissions. Its not possible to produce reports for submission from the SAP software, unlike for new builds, to do would not make any sense and would in all likelihood show fail in many of the section of the report, this is because the SAP software is there to demonstrate compliance against Part L1A, new builds, and not existing ones, albeit some with a new element to them, like an extension.

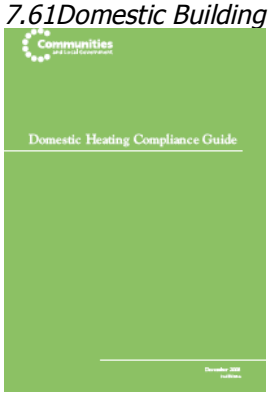
The SAP software is used to produce the CO2 emissions figures and a separate report, in my case one I have developed that will demonstrate compliance and should be submitted to Building Control. The SAP calculator input documents can be used to support that report if requested by Building Control.

7.6 Controlled Services
Controlled Services are the heating, hot water, lighting etc. You would think that given the wide choice of different designs and equipment that could be installed into a dwelling there would be more to this section, in terms of complying with the Regulations, but in reality its very simple.

When we carry out the calculations as mentioned above there is no provision to include the effect of the controlled services, except for a whole building calculation where the services as designed are input, and the CO2 emissions associated with them are included in the final figures. They do have an impact, for example if you were choosing between a gas fired boiler and an oil fired one, the CO2 emission associated with gas boiler are going to be considerably lower than those for the oil one. If the building currently has a gas supply and you choose to put an oil boiler in, the Notional Building will have a gas boiler, not an oil one, therefore you would struggle to match the CO2 emissions from the as designed compared to the Notional without making up for the excessive CO2 emissions from the oil boiler by compensating elsewhere.

For an extension however, all we are doing when we check the design is to look for what is proposed, and ensure it meets the minimum requirements in terms of efficiency and its controls.
The place to check for what is required is in the "Domestic Building Services Compliance Guide".

7.61Domestic Building Services Compliance Guide



In general terms the requirements are that if an appliance is to be replaced, it should not have an efficiency of less than the current one. If is a new appliance it should meet the minimum requirements for efficiency and controls as set out in the Compliance Guide

The guide is available from http://www.planningportal.gov.uk/uploads/br/BR_PDF_PTL_DOMHEAT.pdf

There's no point me repeating what is inside the Guide, its 127 pages long, but I will provide a summary. It surprises me how many people do not know of this documents existence, let alone use it, for sure its invaluable to assessors because it provides guidance in terms of the input we need to enter into the SAP tool, however, it also a good general guide to the minimum requirements for most the HVAC in domestic buildings, and as such an excellent reference tool.

Basic contents are for each type of system, there is an Introduction to the technology, Scope of the guidance, Key Terms followed by technology specific guidance for minimum efficiencies etc.

It covers the following technologies after a General Introduction:

- Gas fired space heating & hot water systems
- Oil fired space heating & hot water systems
- Electric heating systems
- Solid fuel heating systems
- Community heating systems
- Underfloor heating systems
- Mechanical ventilation systems
- Heat pump systems
- Comfort cooling systems
- Solar water systems

- Micro combined heat and power packages
- Heating system circulators

There is a summary of the recommended minimum efficiency standards for building services in the Introduction, a quick glance through it and you can see that the minimum efficiencies required are conservative, and most can be improved upon.

If a technology is not in the above, like PV and wind for example, the as designed and Notional would be the same values. If another technology, reasonable provision would be demonstrated by showing that the technology as proposed gives a performance that is no worse than a reference system of the same type, which is in the Guide.

7.7 Commissioning of Fixed Building Services
Although in ADL1B this is not something that, as an assessor we have direct influence over, and therefore its not something that needs to be covered. However, most fixed heating and hot water equipment, and mechanical ventilation will need to be commissioned and when done so should be reported to Building Control within 30 days if completed by someone belonging to a competent persons scheme, i.e. the plumber or electrician.

7.8 Consequential Improvements to Energy Performance
I have touched on this above, and its common particularly with extensions, that if the heat losses from the extension as designed are higher than of a Notional one, then these can be made up for by implementing some consequential improvements on the existing house. Building Control readily accepts this and it's a good way of getting around the issue of over glazing in an extension for example. The sort of things than can be done are increasing loft insulation, cavity wall filling, replacing windows etc – anything that will improve the thermal efficiency and that can calculated in a heat loss calculation.
I have demonstrated this on a couple of project by showing a reduction in the ventilation losses, although I feel it's a bit more finger in the air as far as the figure go because its difficult to put a figure on existing buildings, unlike new buildings which have a figure designed in mind, and the method of construction and the air permeability would support that figure. In existing buildings this is unlikely unless recently built and the figures are available.

Otherwise Consequential Improvements in their true meaning in terms of ADL1B, are that if the building has a total useful area of over 1000m2 and where the work consists of an extension, the initial provision of a fixed building service, or an increase to the installed capacity of a fixed building service, then Consequential Improvements should be carried out if technically and feasibly possible. There are not many dwellings that are over 1000m2, so actually implementing this is very rare, except in the ways mentioned above with an extension for example. Consequential improvements mainly affect commercial buildings where the above is more likely.

7.9 Providing Information
As the owner of the building, if there are new or replacement fixed building services then details of these should be provided to them with how to operate and maintain them. Usually the person who installed them will supply this information.

8.0 What information is required to carry out the calculation?

It's a lot simpler to carry out the calculations and produce the report for an extension than it is for a Change of use or a Renovation, however there are a number of similarities for the information that is required.

For all L1B calculations a full set of scale drawings, showing the floor plans, internal sections, external elevations and an external window/door schedule is a must for all.

A construction specification, either written or in the form of detail sections, showing the materials and thicknesses of each layer in the construction of the floors, walls and roofs.

For the window and doors the U Values, or at least details of the construction – double glazed, low-e, argon filled, gap size between the panes.

Details of the heating and hot water provision, particularly the boiler or other heating system make and model number, the heating controls, type of heating emitter i.e. radiators or Underfloor, and details of what lighting is to be used. This is the minimum for an extension for example, if its for a Change of Use or Renovation then more information would be required, in line with a SAP for a new build. We have a Checklist which details all the information required for a Change of use or a Renovation.

In many projects, if the existing house requires consequential improvements, albeit on a small scale like the loft insulation being increased, the area and construction details of the existing part of the building will also be needed.

If it's a Change of Use, the as designed details need to be provided, as above, but these need to include all construction details and drawings of the whole building, both existing elements that will be and won't be upgraded, but also the new elements as well. So for example, if part of the ground floor is to remain as is, and part will be upgraded to bring it level to the new extension which also has a new floor, then we would need to be able to work out the area and U Values of each one of the three floors. The same would be done for all the thermal elements in the building.
Likewise if some of the windows are to be replaced, some are to remain unchanged, some new ones are to be installed in the existing building, and some in the new extension, there are four different window types that we need to know work out the areas and their u values.

When providing area weighted U Value calculations, the thermal element are minus their openings, so each element – floors, walls, roofs, windows doors and roof lights are each area weighted in the calculation to provide the overall heat losses and for some projects requiring the whole house calculation, the CO2 emissions too.

With all the information that is required, we have Checklists detailing what is important, particularly for Change of Use and Renovations which are more complicated, and for extensions the basic information required is as listed above.

If you have any comments or suggestions to make regarding the content of this book please contact me at info@energy-saving-experts.com.

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Appendix 1

AD Part L1B Calculations

Prepared by Mike Andrews
Energy Saving Experts Ltd
Report Date 06/06/2012

New extension to xx
Assessed under Approved Document Part L1B 2010

Building control Reference: n/a **Building Control Condition/s:** n/a

Part L1B Compliance Criteria

The overall heat losses from the extension as planned should be no more than for an extension meeting the minimum requirements for the thermal elements and controlled fittings.

1.0 Improve the U Value of the thermal elements and controlled fittings.

1.01 Minimum Required

Element	Area m2	U Value	W/m2
Floor	44	0.22	9.68
Wall	46	0.28	12.88
Wall	13.2	0.28	3.70
Roof	44	0.18	7.92
Total	147.2		34.18

Area weighted U Value = 0.232

U Values of Controlled fittings:
Windows 1.6
Rooflights 1.6
Glazed Doors 1.8

1.02 As Planned

Element	Area m2	U Value	W/m2
Floor	44	0.176	7.34
Wall	46	0.275	12.65
Wall	13.2	0.263	3.47
Roof	44	0.18	7.92
Total	147.2		31.79

Area weighted U Value = 0.216, a reduction of 0.02

U Values of Controlled fittings:
Windows 1.6
Rooflights 1.6
Glazed Doors 1.8

2.0 Heat Loss Calculations

2.01 Minimum Required

Element	Area m2	U Value	Heat Loss W/m2
Floor	44	0.22	9.68
Wall	38.69	0.28	10.83
Wall	13.2	0.28	3.70
Roof	40.31	0.16	7.26
Windows	0.42	1.6	0.67
Roof lights	3.69	1.6	5.91
Glazed doors	6.89	1.8	12.40
Total	147.20		**50.44**

25% of floor area = 11.00 m2 + area of closed openings from existing building as a result of the extension 26.18 m2 = Total area 37.18m2. This has been apportioned above to reflect the planned areas below.

2.02 As Planned

Element	Area m2	U Value	Heat Loss W/m2
Floor	44	0.176	7.34
Wall	28.5	0.275	7.84
Wall	13.2	0.263	3.47
Roof	35.15	0.16	6.33
Windows	1	0.16	1.6
Roof lights	8.85	1.6	14.16
Glazed doors	16.5	1.8	29.70
Total	147.2		**70.84**

The above as planned shows a shortfall **of 20.40 W/m2**

3.0 Improvements to Existing Building

The existing main house will have all the single glazed windows replaced with double glazed units.

Element	Area m2	U Value	Heat Loss W/m2
Existing windows	26.18	5.0	130.90
Replacement windows	26.18	0.16	41.89
Difference			**94.69**

4.0 Total heat loss:

Total Heat loss difference between Minimum Required and As Planned in the extension = **+20.40 W/m2.**

Total Heat Loss difference between existing building as is to the existing building with the windows replaced = **-94.69 W/m2.**

Total Heat loss difference between the existing house today and consequential Improvements equal a reduction of **74.29 W/m2.**

5.0 Controlled Services

The heating to the extension will be underfloor heating. The lighting will be all low energy.

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