

A Guide to Compliance When Designing Domestic Extensions



Introduction

Approved Document L1B provides guidance on complying with the requirements of Regulation L1 dealing with the conservation of fuel and power. It is one of four Part L Approved Documents and deals specifically with work to existing dwellings. The Herts Building Control Technical Forum (HTF) has produced this guide to clarify the documents contents in relation to the design of extensions to dwelling houses. A separate guide (No 19) is available dealing with schemes involving a change of use to form a dwelling.

Scope

The document outlines the energy performance standards required for 'Thermal Elements'. These are walls floors or roofs that separate the heated space from the external environment or from unheated spaces or such as garages. The four types of thermal element are '*new*', '*replacement*', '*renovated*' and '*retained*' although it is mainly new elements that are relevant to this particular guide.

The document also gives guidance on the specification of '*Controlled Fittings*' such as windows, doors and rooflights and '*Controlled Services*' such as lighting, heating, mechanical ventilation and air conditioning. Section 3 advises on the need for the builder to provide the house owner with simple instructions on how to use heating and hot water systems and associated controls in a way that achieves maximum energy efficiency.

Walls Roofs and Floors

Table 1 - U- Values for New Elements

	U-Value (W/m ² °K)
Wall	0.28*
Pitched Roof – insulation at ceiling level	0.16
Pitched roof – insulation at rafter level	0.18
Flat Roof or Roof with integral insulation	0.18
Floors	0.22

* area weighted average

Lesser standards of floor insulation are acceptable where there is a significant problem in matching floor level to existing. When calculating the U-value of a floor using its perimeter and area, this can be taken as that of the enlarged dwelling. To help designers meet the above standards, the Herts Technical Forum has updated its **Technical Note 10** (U-Values of Elements). This suggests a variety of compliant specifications using commonly available insulation materials. Building Control will consider other solutions subject to performance being calculated using the conventions set out in *BR443 Conventions for U-Value Calculations*

Windows, Rooflights and Doors

These should incorporate draft proofing and meet the performance shown in the table below. The U- values are calculated for the whole unit i.e. the combined performance of glazing and frame. Insulating cavity closures should be incorporated when forming the openings in this type of wall.

Lesser standards may be acceptable in buildings where aesthetic appearance is critical such as buildings of architectural or historic importance. We suggest that you seek further guidance where this is the case.

Table 2 - Energy Ratings and U-values for Windows, Doors and Rooflights

Fitting	Standard
Windows, Roof Windows and Rooflights	Maximum 1.6 W/m ² °K <u>or</u> Window energy rating band C or better
Doors including glazed doors	Maximum 1.8W/m ² °K or

You can find typical compliant specifications for fittings in the HTF Technical Note 10.

Limits on the Total Area of Openings

The area of openings (windows, doors and rooflights) to an extension should not exceed 25% of the floor area of the extension plus the area of any existing openings enclosed by it. Where this can not be achieved, there are optional criteria allowing for greater areas and these are described in the following two paragraphs.

Optional Approach 1 - Area Weighted U-Value

To allow for more design flexibility, L1B makes provision for extensions that may not accord strictly with the U-value and opening area restrictions described above. A designer has the option to show compliance by carrying out a calculation demonstrating that the 'Area Weighted U-Value' of all the thermal elements and exposed openings is no greater than that of an extension of the same size and shape that complies with the elemental U-value standards. The method of calculation is described in paragraph 4.5 of the approved document. In dealing with resistance to moisture from condensation, Approved Document C suggests absolute upper U –value limits of 0.7 W/m² °K for walls and floors and 0.35 W/m² °K for roofs.

Optional Approach 2 - Whole Dwelling SAP

A designer can exploit even more design flexibility by using a SAP (2009 version) calculation for the whole extended dwelling to make a comparison with expected carbon emissions from a dwelling with an equivalent compliant extension. This method gives the potential for 'trade-off' by improving the performance of the existing house. Any improvements must at least meet the standards below. This calculation would normally be carried out by a specialised energy assessor using accredited software.

Table 3 - Upgrading Existing Thermal Elements

	U-Value (W/m² °K)
Wall – cavity insulation	0.55
Wall – external or internal insulation	0.30
Floor	0.25
Pitched Roof – insulation at ceiling level	0.16
Pitched roof – insulation at rafter level	0.18
Flat Roof	0.18

Extensions to Form Conservatories

The accepted definition of 'conservatory' for building control purposes in Hertfordshire is a ground level extension that is thermally separated (see a. below) from the dwelling and has not less than three quarters of its roof area and one half its exposed wall area made from translucent material. In the interests of fire safety, Herts Building Control authorities accept that walls that are within 1 metre of the facing boundary can be excluded from this calculation. Conservatories less than 30 m² in floor area and having safety glazing in critical zones are exempted from building regulations control although full exemption does not apply if the heating system of the house is extended into the new room. In the latter case Building Control would require an application in order to ensure that the design shows compliance with Part L provisions for thermal efficiency. Exemption from the other requirements stands.

You should note that regulatory requirements relating to electrical wiring still apply irrespective of the conservatory's exempt status. Contact Building Control or see the HTF guidance leaflet on Part P – Electrical Safety if you are unsure whether this is relevant.

It is common for conservatories that are not exempted from control to 'fall foul' of the limits placed on areas of openings. Approved Document L1B recognises this and states that such designs can be acceptable if all the following criteria are followed:

- a. The extension must be separated from the existing by walls, doors and windows giving a level of thermal insulation equal to or better than exposed elements to the existing dwelling. Openings must be draft-proofed.
- b. The heating system to the room must have independent temperature and on/off controls and any heating appliance must be reasonably efficient i.e. accord with the Domestic Services Compliance Guide.
- c. U values for thermal elements and openings must accord with tables 1 and 2 above.

Controlled Services (Heating and Hot water)

Where schemes include the extension or replacement of an existing system, the rules aim to ensure that the new system meets a minimum standard of energy efficiency and is not significantly less 'carbon efficient' than the original. The designer can establish the adequacy of a new system by referring to the 'Domestic Building Services Compliance Guide 2010' published by NBS. Where there is a change in the fuel type, SAP 2009 gives carbon dioxide emission factors with which to calculate equivalent ratings.

The above guide is a lengthy and highly detailed document giving standards for many types of heating system, fuel and controls. A typical specification for a replacement natural gas boiler would be a condensing unit with a SEDBUK 2009 (efficiency) rating of at least 88% linked to a fully pumped system with boiler interlock (switches off when no demand for heating) and zone, timing and temperature controls. Different standards apply to dwellings with floor areas over 150m².

L1B requires that every new system is commissioned by a person competent to do so and that the owner is provided with sufficient written guidance to enable him to operate the system efficiently. Gas installations must be undertaken by a person who is listed with the 'Gas Safe' register

Controlled Services (Lighting)

Light fittings also need to accord with the Domestic Building Services Compliance Guide. This means that at least three out of four fittings should be low energy type i.e. have luminous efficacy of not less than 45 lumens per circuit-watt and total output greater than 400 lamp lumens. Light fittings supplied by less than 5 watts can be excluded from the overall count. In recognising that low energy type lamps are now dominating the market A.D. L1B states that standard fittings fitted with low energy lamps are acceptable.

External lighting must either meet the above efficiency standard with fittings being both manually switched and automatically controlled to switch off when daylight is sufficient or must consist of fittings that have movement and daylight sensors and lamp capacity not exceeding 100 watts.

Other Controlled Services

The Domestic Services Compliance Guide covers minimum standards in relation to mechanical ventilation, air conditioning and renewable energy systems (heat pumps and solar panels). Fixed air conditioning systems are required to have an energy efficiency rating of Class C or better.

Construction Standards

Irrespective of the quality of materials used, there is a major potential for heat loss and cold bridging caused by poor standards of construction in terms of airtightness and the continuity of insulation. For this reason it is important for the designer to ensure that the various insulated elements in a building are carefully detailed at junctions. Uncontrolled air leakage can be minimised by specifications calling for appropriate levels of sealing and the Accredited

Construction Details produced by CLG suggest suitable details for achieving this with typical methods of construction. These are available for viewing along with Approved Document L1B at www.planningportal.gov.uk/buildingregulations .

...In Conclusion

We hope that this guide will help you to better understand Part L1B of the Building Regulations as applicable to the design of domestic extensions. It has not been possible to deal with every issue in full detail and you are very welcome to contact your local authority for further advice on any aspect.