**TECHNICAL GUIDANCE**
**NOTE NO 20**

# Approved Document L1A 2006

## A Guide to Compliance When Designing **New Dwellings**

(Issued August 2006)



**Introduction**
Approved Document L1A 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 the design of new dwellings. The Herts Building Control Technical Forum (HTF) has produced this guide to clarify the documents contents for Local Authority Building Control customers. Separate guides are available on Approved Document L1B and deal with schemes involving an extension to a dwelling or a change of use of a building to a dwelling. Our Technical Note 'U-Values of Elements' is a useful reference of construction specifications suggested by insulation manufacturers to meet relevant performance standards.

**Scope**
The document outlines the energy performance standards required for new dwellings but this does not include buildings containing 'rooms for residential purposes' such as nursing homes and student accommodation. The common parts of apartment blocks are also outside the scope of L1A and for these categories document L2A is the appropriate reference.

Unlike previous versions of Part L, there is now only one method of demonstrating compliance with the energy efficiency requirements and this is mainly based around carbon dioxide emission rates as calculated using the current version of the 'Standard Assessment Procedure' (SAP 2005). In carrying out this calculation, the assessor must include an assumed airtightness rating that may have to be validated by testing of the completed building. L1 also makes a requirement that heating and hot water systems are properly commissioned by the installers and that sufficient information is provided to the occupiers to enable them to use the fixed building services in an energy efficient way.

**SAP 2005 and Carbon Dioxide Emissions**

Under L1A, all dwellings must be designed and built such that their Dwelling Carbon Dioxide Emission Rate (DER) measured in kg of $CO_2$ produced annually per $m^2$ floor area is no worse than a defined Target Carbon Dioxide Emission Rate (TER). The TER is based on a notional building of the same shape and size. SAP 2005 is the calculation tool for the TER and DER for all dwellings up to 450$m^2$ in floor area. The TER approximates to a 20% improvement on emission levels from a building complying with the 2002 edition of Part L and includes a 'fuel factor' that compensates for fuels that produce greater emissions than natural gas.

A designer should submit a preliminary SAP calculation to the Local Authority to accompany an application for Building Regulations approval. This will demonstrate that the design can comply with Regulation L.1. On completion of the building, the developer must submit a second calculation that reflects any changes from the original design and is based on the result of the airtightness test carried out on the dwelling. Both calculations must show that the DER does not exceed the TER. The calculations can be done by authorised (certified) SAP assessors. Uncertified ratings submitted with an application must include a comprehensive list of the input data to show that it correlates with the plans and the completed building. All ratings must be calculated using one of the programs that have been tested by the Building Research Establishment and approved by the Department of Communities and Local Government (DCLG). A list of approved software can be obtained at www.bre.co.uk/sap2005. In making a calculation, the following issues are considered: -

- Hot water and space heating systems
- Dwelling dimensions and layout
- Ventilation sources and airtightness standard (see below)
- U-values of walls, floors, roofs, doors and windows
- Solar gains

Until the building is complete and has been pressure tested, the air permeability figure has to be assumed for the purposes of the SAP calculation. This would usually be not more than 10$m^3$/hour/$m^2$ at an air pressure of 50 pascals (Pa). The designer has the option to assume a lower figure than this but a higher level of performance will need to be confirmed by subsequent test results or the building will fail the test and may not comply.

This new method in L1A gives a high degree of design flexibility although Table 2 of the Approved Document shown below lays down 'bottom line' limiting U-Value standards in terms of individual areas of elements and area weighted averages for walls, floors etc. This is to ensure that the design is 'robust' enough not to have its performance seriously affected by future alterations such as a change to a less efficient heating system. The inclusion of low and zero carbon systems such as wood pellet boilers, solar panels, photovoltaics and wind generators is a positive measure to trade off against other factors in the design.

**Table 2 – Limiting U-Value Standards (W/m$^2$ $^o$K)**

| Element | Area-weighted Average U-Value | Limiting U-Value |
|---|---|---|
| Wall | 0.35 | 0.70 |
| Floor | 0.25 | 0.70 |
| Roof | 0.25 | 0.35 |
| Windows, Rooflights and Doors | 2.2 | 3.3 |

As may be construed from the above information, an Architect needs to use the SAP during the design phase to ensure that the dwelling will be compliant with Regulation L.1. SAP is also useful in producing a list of the features that are critical to achieving compliance. This may be a particularly low U-value to an element or a high performance heating boiler.

**Pressure Testing of Dwellings**

Pressure tests need to be carried out by an independent qualified (or accredited) person following the approved procedure described in the ATTMA publication 'Measuring Air Permeability of Building Envelopes'. In a development of multiple dwelling units, the number that need to be tested will depend on the number of 'Dwelling Types' in the scheme. Dwelling types are units of similar generic form and can be grouped as follows; -

1) Detached
2) Semi-detached and end terrace
3) Mid terrace
3) Apartments

If units are built with different construction methods then these must be treated as separate dwelling types.

Generally the developer will need to test at least two units of each type in a development and Building Control will select these. For less than 4 units, only one test of each type is needed. For sites of greater than 40 units at least 5% of each type must be tested but this is reduced to 2% where the first five units tested are found to meet the design air permeability. In the future there may be a system of robust details for Part L (similar to the Part E Sound Insulation details) that will allow only one of each type to be tested.

On small developments of up to two units, it is not necessary to test where the same builder has already constructed and tested a building of the same dwelling type within the previous 12 months. In these cases the earlier test result will be taken as being indicative of the performance of the new building. There is also an option to assume a greater air leakage rate in the SAP calculation (15m$^3$/h/m$^2$) to avoid the need to pressure test but this would necessitate particularly high standards in the design in order to meet the TER.

**Failed Pressure Tests**

A pressure test that shows that the measured air leakage exceeds that assumed in the SAP calculation does not necessarily mean that the dwelling does not comply. A re calculation using the actual test leakage may show that the DER is still less than the TER so is acceptable. If this is not the case then it is necessary for the builder to carry out remedial measures and these would normally involve tracing sources of air leakage with a smoke wand so that additional sealing measures can be carried out followed by a retest.

**Certification and the Commissioning of Heating and Hot Water Systems**

Regulation 20C requires that all such systems are effectively commissioned so that at completion, the systems and their controls are left in the intended working order. It also requires that a builder provide Building Control with certificates as evidence of this on completion of the building. The Local Authority will not be able to issue certificates of completion under the Building Regulations until they have received the final SAP calculation, a pressure test report (where applicable) and any relevant certificates for the

heating appliances in the building. In addition a notice displaying the energy rating from the SAP calculation must be prominently displayed in the new dwelling

**Operating and Maintenance Instructions**
Regulation L.1. also requires that the builder provides new owners with an information pack for the fixed services in the building. This is to enable them to operate such services in an energy efficient manner. This can be made up of guidance provided by the manufacturers of the various components making up the systems and should give easily understood advice on making adjustments to timing and temperature controls and the necessary maintenance schedules for efficient operation.

**Construction Standards**
Irrespective of the quality of insulating 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 TSO Robust Details guide 'Limiting Thermal Bridging and Air Leakage' suggests suitable details for achieving this with typical methods of construction.

The importance of effective on-site supervision to oversee that the quality of workmanship achieves the above standards should not be underestimated. The cost of delays in completion and remedial action could far outweigh the costs incurred in this process.

**…In Conclusion**
We hope that this guide will help you to understand PartL1A of the Building Regulations as applicable to the design of new dwellings. It has not been possible to deal with every issue in full detail and you are very welcome to contact your local authority Building Control section for further advice on any aspect.