

Approved Document L of the Building Regulations (England & Wales) A Compliance Briefing For Housing Professionals

Introduction

In 2006, the government will implement a new Approved Document L of the Building Regulations (England & Wales). This follows a period of consultation which began in July 2004 and has seen the rules for setting carbon targets and achieving compliance in new build changing to a very different set than was originally proposed. The following information provides an overview of the implications of these changes for housing

professionals who wish to continue to enjoy the benefits of specifying electric heating and hot water systems.

The information within this update is derived from current understanding taken from TEHVA's involvement in the Part L Industry Advisory Group, Working Party 2 and on-going discussions with government and its agents.

Electric Heating In The Policy Context

As we move quickly towards global peak oil availability and more locally towards becoming a net importer of gas, there is a recognised need for dramatic shifts in UK energy policy. The Energy White Paper of 2003 quite clearly lays out challenges for the UK that will lead to a shift towards cleaner and more efficient forms of energy generation and distribution. This followed the DTI's commitment in 2000 to pursue a target of 10% electricity production from renewable energy by 2010 and 20% by 2020.

With electric heating operating at 100% efficiency, a cleaner method of generation coupled with more efficient forms of distribution means that the future could and should be very bright for electrical appliances within the built environment. Through TEHVA, electric heating and hot water appliance manufacturers will work with government and other

stakeholders to position electric at the centre of future sustainable energy strategy.

In the short term the government continues, quite rightly, to focus on another of its Energy White Paper commitments; energy efficiency. The implementation of the new ADL in 2006 is the cornerstone of government energy efficiency policy and lays down some demanding yet achievable challenges for the construction sector, particularly in new build. The focus for new build remains an improvement in fabric to reduce heat loss, with a steer clearly towards the specification of innovative measures including solar thermal and ventilation with heat recovery where appropriate. However, fabric improvements alone will ensure house builders can comply with new regulations when specifying electric heating systems.

New Build Compliance For Approved Document L

For the new build sector (ADL1A), compliance will be driven by deriving a Target Carbon Emission Rating (TCER) for a dwelling (or average for a block) and demonstrating design compliance with the target through a Design Carbon Emission Rating (DCER) for the same dwelling (or average for a block). The U value and carbon index methods are superseded by DCER.

The TCER is derived from the following formula:

$$(\text{CO}_2 \text{ Heat/HW} \times \text{Fuel Factor} + \text{CO}_2 \text{ lights}) \times \text{improvement factor}$$

The current fuel factor for electricity is 1.47¹ and the improvement factor is 0.8 (or 20% reduction)².

The base data for calculating TCER is derived from the elemental U values for electrically heated dwellings within ADL 2002 and the new SAP will enable this calculation to be made. Achieving the DCER will be determined by the new SAP as it relates to carbon and not the SAP score itself, which has no relevance to compliance.

¹ At time of writing the fuel factor was still in development and 1.47 is taken for the ODPM July 2004 ADL consultation document.

² 'Targets and Compliance Packages' May 2005 (an Industry Advisory Group briefing paper)

Flexible Route To Electric Heating Compliance

Many housing professionals prefer to specify electric heating and hot water solutions for flats due to:

- Lower capital costs (average up to £1,000 marginally less than gas)
- Build speed benefits (less time spent on site)
- Layout flexibility (flue positioning)
- Saleable service costs (lower maintenance and servicing on costs)

Housing professionals will benefit greatly from the ODPM's decision to allow block average assessments³ for TCER/DCER calculations. This gives plenty of flexibility in overall design and will enable compliance to be met through a mix of improvements in materials, construction method and air tightness along with possible specification of innovative measures.

³ Average means that each unit will have its own rating and compliance be assessed as the sum of all the individual targets and design actuals after weighting for floor area averages. Weighting is achieved by multiplying the carbon per m² by the dwelling floor area (m²) and then dividing the sum of all dwellings by total dwelling floor area (m²)

DCER Fabric Compliance Options

Using a BETA version of the new SAP, TEHVA research found that in an average block, compliance for panel heaters could include:

Dwellings	As built U values 2002 (notional building)	Improved 2006 regulation with no improved values (individual dwellings)	Improved 2006 regulation with improved values (block by floor)	Improved values used
16 ground floor flats	16 pass	16 fail	11 pass, 5 fail	Windows 1.9
17 intermediate flats	17 pass	1 pass, 16 fail	9 pass, 8 fail	Ground floor 0.20
14 top floor flats	14 fail	14 fail	8 pass, 6 fail	Walls 0.30
				Roof 0.14
Block average result	N/A	FAIL	Block PASS	Air tightness 5m ³ /m ² /h@50pa

Note: Air tightness values can be traded off against improved u-values (e.g. window u-value of 1.8 allows air tightness of 6m³)

This is only an exemplar. The flexibility for achieving block average DCER means that U values across a range of the above can be played with as suits the house builder/specifier.

Achieving improved wall U values for multi-storey blocks has been considered within the Industry Advisory Group and it has been noted that the design structure of most blocks of flats can accommodate increased cavity widths to >100mm to achieve the wall U Value improvement. Aircrete blocks offer excellent thermal, acoustic and load bearing capabilities and with thin jointing can reduce build times and improve U value performance. External insulation can easily accommodate the U value improvements and will also provide latitude to improve thermal bridging performance.

Improved thermal bridging performance will have a substantial impact on the overall DCER of a dwelling or block average. An ODPM funded

demonstration project at Stamford Brook identified a range of construction details that would enhance thermal bridging performance including split lintels, incorporation of a course of low thermal conductivity blockwork at the junction between external walls and ground floor slabs, setting of door and window frames in the plane of the wall insulation and use of modified roof trusses to ensure adequate thickness of insulation at the eaves. The effective allowance for thermal bridging with these values varies between 0.03 and 0.05 W/m²K versus the base requirement of 0.08W/m²K.

It is also worth considering that the glazing specified as a % of total floor area does have an impact as reduced openings can help with compliance moving from the ODPM default consideration of 25% down to a more market consistent 10-15%.

DCER Advanced Compliance Options

TEHVA research has found that the option of specifying solar thermal panels to serve penthouse or top floor dwellings provides a significant carbon swing in the DCER which offers even greater flexibility for the fabric. Providing solar dedicated to the top floors also alleviates concerns regarding available roof space, specification of pipework and putting in place management arrangements for billing customers.

TEHVA is currently feeding into the SAP revision process with the aim to ensure that high performance ventilation with heat recovery will achieve carbon reduction benefits within the new SAP. If this objective is achieved, TEHVA will provide a full update to interested stakeholders.

The Importance Of SAP And The Reality Of Cost

The new ADL1A will for the first time put SAP at the forefront of compliance as the DCER calculation replaces the carbon index methodology. SAP takes into account thermal insulation, heating costs, appliance efficiency, ventilation characteristics and solar gain.

It is important to note that whilst SAP is used as a carbon compliance tool for the new ADL1A, the SAP score has little bearing on compliance as the regulation is concerned with carbon as a policy driver rather than the cost implications

of fuels as used within SAP. Furthermore, housing professionals will be aware that when considering the cost of running a heating system, SAP fails to take into consideration the wider cost of ownership issues such as increased capital cost of equipment, regular servicing and on-going maintenance requirements related to gas and oil systems. In capital cost terms, a gas or oil system can add around £1,000 per dwelling compared with electric and the on-going servicing and maintenance exposure will range between £75³ and £192⁴ per annum.

³ National Landlords Association – average annual service charge assessment Spring 2005
⁴ British Gas Services 3 star leaflet – January 2005

Conclusion

With demand very quickly outstripping supply, the global community has slowly reacted to address the issue of climate change and energy efficiency. Fossil fuels are not only finite but their burning has a severely detrimental impact on the natural environment, economic stability and the health of the global population. The U.K government has tough obligations and aspirations to reduce carbon emissions. Over time this will manifest itself in ever tougher building regulation that promote and reward the incorporation of clean, renewable energies.

Electric heating has, and will increasingly have, a significant role to play in providing a sustainable energy solution. At present, it is expected that the revised ADL1 represents opportunities for housing professionals to take an innovative approach to ensure compliance. By coordinating a combination of factors their buildings can and will meet the TCER and SAP ratings with electric heating and hot water appliances.