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Mitsubishi Electric Guide to Part L & European Legislation Affecting Use of Heat Pumps

Information Guide 52

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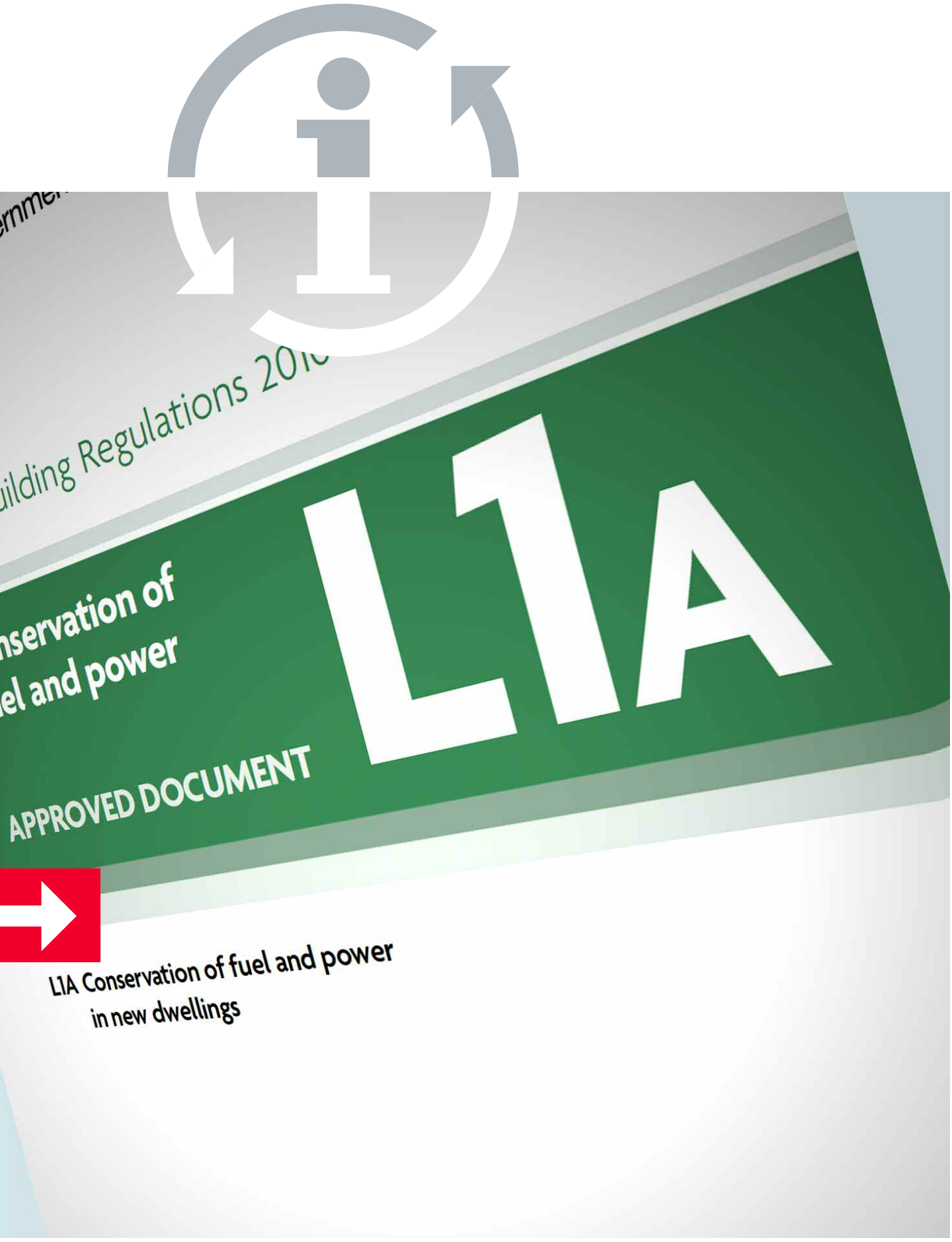

L1A Conservation of fuel and power
in new dwellings

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This is an independent guide produced by Mitsubishi Electric to enhance the knowledge of its customers and provide a view of the key issues facing our industry today.

This guide accompanies a series of seminars, all of which are CPD certified.

Contents

Background to Part L - links to EU legislation and regulation

Part L of the Building Regulations deals with the conservation of fuel and power in domestic and commercial buildings.

The legislation covers new-build and refurbishment projects and is a section of the Building Regulations that has been updated regularly since 2002, and in April 2014 the latest version, which is known as Part L (2013), came into force.

The latest version of Part L was somewhat delayed in its introduction, and the construction industry was expecting more significant changes to existing targets on carbon emissions and energy use than have been introduced.

However, there are a number of important developments that designers, installers and building managers need to be aware of. Although new targets for carbon and efficiency may not seem very much higher than current levels, there are changes to calculations and also a more flexible approach to achieving a Part L compliant building.

Overall, the Government is increasing carbon targets on new homes through a 6% reduction in CO_2 emissions against 2010 levels. This will be across the entire 'build mix' of flats, terraced homes, detached houses etc. Levels for non-domestic buildings depend on the type of building (shown in Table 1), but the aggregate reduction across the entire non-domestic building mix is 9%.

Table 1: Improvements on carbon emissions required for new non-domestic buildings

Distribution warehouse	4%
Deep-plan office with air conditioning	12%
Retail warehouse	8%
Shallow-plan office	13%
Hotel	12%
School	9%
Small warehouse	3%
Aggregate across building mix	9%

It should be noted that the Government has made a strong commitment to zero carbon homes, and also that the European Union requires member states to achieve 'nearly zero energy' buildings from 2019.

Low carbon and low energy are not the same thing: it is possible to have a low carbon building which still uses a lot of energy, even if that is produced using low-carbon technologies such as photovoltaics.

Part L 2013 is an attempt to move towards achieving both lower carbon emissions and less energy use, which is why rules on achieving compliance have been changed.

Another challenge for Government is that it is attempting to achieve a more sustainable built environment, but against the backdrop of the difficult economy. Therefore, there is more emphasis in this revision of Part L on compliance in a cost-effective way.

HM Treasury has committed to ensuring that legislation does not increase costs for an industry. This has become known as the 'one-in-two-out' rule, because for every £1 of extra cost imposed on an industry, the legislation has to make a saving of £2 for that sector. Part L 2013 therefore has to strike a balance between achieving lower carbon buildings, while not holding back growth in the construction industry.

Calculations for Part L - how compliance is shown

As with previous Part L versions, there is a prescribed method for showing compliance with the regulations. These are different for homes and non-dwellings. The compliance calculation methods for Part L 2013 reflect a greater emphasis on value for money of low carbon technologies. There is also a greater requirement to demonstrate energy efficiency as well as carbon reduction.

Compliance - homes (dwellings)

Under Part L, compliance for dwellings is calculated using the Standard Assessment Procedure (SAP). This has not changed greatly, but it now takes into account a new Target Fabric Energy Efficiency (TFEE).

SAP works by comparing a new dwelling against the carbon and energy performance of a 'notional' building. The notional dwelling is the same shape and size as the actual dwelling, and is based on a set of fabric and service specifications. The new dwelling must match or better that notional performance.

There are now two targets that the real building must meet: a Target CO_2 Emission Rate (TER), which has always been in place; and the new mandatory Target Fabric Energy Efficiency (TFEE). The TFEE sets a maximum limit on the amount of energy (kWh/m^2/year) that is needed to maintain comfortable internal temperatures. This figure is therefore largely influenced by elements such as overall building fabric performance, U-values and thermal mass, along with factors such as solar gain.

In the SAP calculation, the TFEE is calculated on the notional building, and a 15% margin is added to this TFEE to allow for flexibility in the building design and construction. It is believed that in the next version of Part L, this margin will be reduced, or removed.

Part L 2013 uses what is known as an 'elemental recipe' approach to calculating the TER and TFEE on the notional building. This mix of elements includes U-values for walls, floors, roof, windows as well as air tightness and gas boiler efficiencies. Part L 2013 states that if the actual dwelling is constructed entirely to the notional dwelling specifications it will meet the CO_2 and energy efficiency targets. However, designers and developers are free to vary the specification as long as the targets are met or bettered.

By setting targets for both carbon and energy use, the new Part L 2013 prevents any dwelling meeting Part L requirements by offsetting poor fabric performance with renewables or low-carbon technologies.

Compliance - non-dwellings

Part L 2013 compliance is similar to that already in use for the current version of the legislation. The fabric standards (TFEE) are not applied to non-dwellings. The main changes relate to the setting of minimum standards for the performance of building services equipment, and also the setting of the Target Emission Rate (TER).

The TER for non-dwellings must now include an element of cost/benefit analysis. There is also a 'recipe' based approach which balances building fabric performance with improved efficiencies in building services. Different approaches can be taken to meet or improve on the performance of the notional building.

There are a number of tools for calculating compliance with Part L 2013, one of which is the Simplified Building Energy Model (SBEM), which was designed by the Building Research Establishment (BRE). SBEM has been updated to allow for the changes to Part L, and also contains other areas of improvement such as better treatment of shading devices and PV systems. There is also now a method for adding a new technology to SBEM, which reflects the Appendix Q relating to SAP, now called the Product Characteristics Database (PCDB).

Low Carbon Technologies - a new obligation

Although there is an emphasis on ensuring that low-carbon technologies are not used to compensate for poor design or construction, Part L 2013 includes some new mandatory steps for considering the potential for use of low-carbon technologies in both homes and non-domestic buildings.

One of the most significant rules is that before construction starts, the technical, environmental and economic feasibility of high-efficiency alternative systems are considered and taken into account.

These systems include:

- Decentralised energy supply systems based on energy from renewable systems
- Cogeneration (using electricity whilst recovering and using heat)
- District heating, particularly when based on renewable sources
- **Heat pumps** (air, water or ground-source)

Alongside Part L 2013, section 9 of the Government's Domestic Building Services Compliance Guide deals extensively with heat pumps. The guide covers ground source, water source and air source heat pumps.

The Compliance Guide points out that all heat pump systems are at their most efficient when the source temperature is as high as possible, the heat distribution temperature is as low as possible, and pressure losses in air and water systems are kept to a minimum.

Heat pumps should be CE marked in accordance with applicable EU directives and if installed in a new dwelling, heat pumps should use refrigerants complying with the provisions of EU Directive 2037:2000.

The Non-Domestic Building Services Compliance Guide points out that while it recommends minimum energy efficiency standards for components of building services, it is important to note that higher standards will have to be achieved in order to meet the Target CO_2 Emission Rate (TER) as calculated by the National Calculation Methodology in tools such as SBEM.

European Directives - be aware

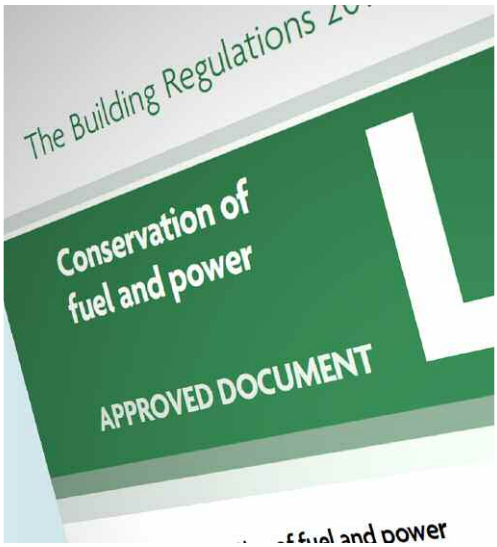
The Compliance Guides for Part L highlight the fact that while UK designers and builders must comply with UK law, the design and installation of fixed building services such as boilers or heat pumps must also comply with all relevant requirements of EU directives as implemented in the UK.

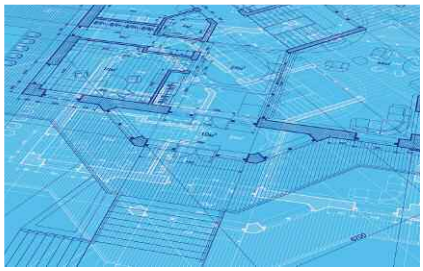
This means that it is very important to be aware of a number of directives that are in force, or are due to come into force in the next few years.

One of these is the Ecodesign Directive 2009/125/EC. It provides a framework for establishing requirements for 'energy-related' products in Europe. Current requirements cover products such as boilers, light bulbs, washing machines and others. In the future, requirements will also cover other products such as windows, shower heads and air to water heat pumps.

The intention is that the recommended minimum product standards in Part L should match the energy efficiency standards set out in EU regulations as they come into force. So it is important to ensure that you are aware of what regulations are in force at a particular time. Also, although standards may be published, they do not necessarily come into force for a number of years after publication.

Seasonal Coefficient of Performance (SCOP) is the current Ecodesign Directive measure for space heating air to air heat pumps with an output of 12kW.





Others important Directives to note are:

Energy Labelling Directive 2010/30/EU which classifies products A++ to G. The labels are now familiar to consumers, and they provide an indication of the energy performance of a product. Heat pumps are covered by this directive (in ErP Lot 1, 2 and 10) and will have to carry a label from 2015.

It is significant that at the end of 2013 the EU agreed to make labels for all heat generators look the same. This will make it easier for consumers to compare technologies and will put heat pumps high on the energy efficiency scale. Only heat pumps with an efficiency of A+ and better will be allowed onto the market from 2015 under minimum efficiency requirements.

Renewable Energy Sources (RES) Directive 2009/28/EC provides a framework for the promotion of energy from renewable sources. It sets a mandatory target of 15% of energy generation from renewable sources by 2020. This is particularly important for the building services sector as the directive sets out criteria for the training and certification of installers of renewables.

It also specifies (Annex VII) the standards that heat pumps must achieve to be recognised as renewable technologies by the directive, which is that the Seasonal Performance Factor (SPF) of a heat pump should be at least 2.5 for the energy used to be counted as 'renewable'.

Energy Efficiency Directive 2012/27/EU provides a framework of measures for promotion of energy efficiency in the EU. The goal is for the EU to reduce primary energy consumption by 20% by 2020. Legislation to implement this directive in the UK will be published in June 2014. This will include, for example, regulations to ensure that public authorities only purchase energy efficient products, services and buildings.

Useful sources of information:

Part L developments: **planningportal.gov.uk**

Eur-Lex (European Law): **eur-lex.europa.eu/en**

European Heat Pump Association (EHPA): **ehpa.org**

To receive a CPD seminar on ‘Part L & European Legislation Affecting Use of Heat Pumps’ you can call your Mitsubishi Electric Regional sales office to arrange an in-house presentation of this information.

If you would like to receive invitations to future CPD events, please email **livingenvironmentalsystems@meuk.mee.com**

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